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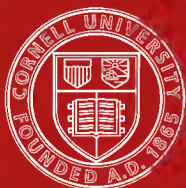
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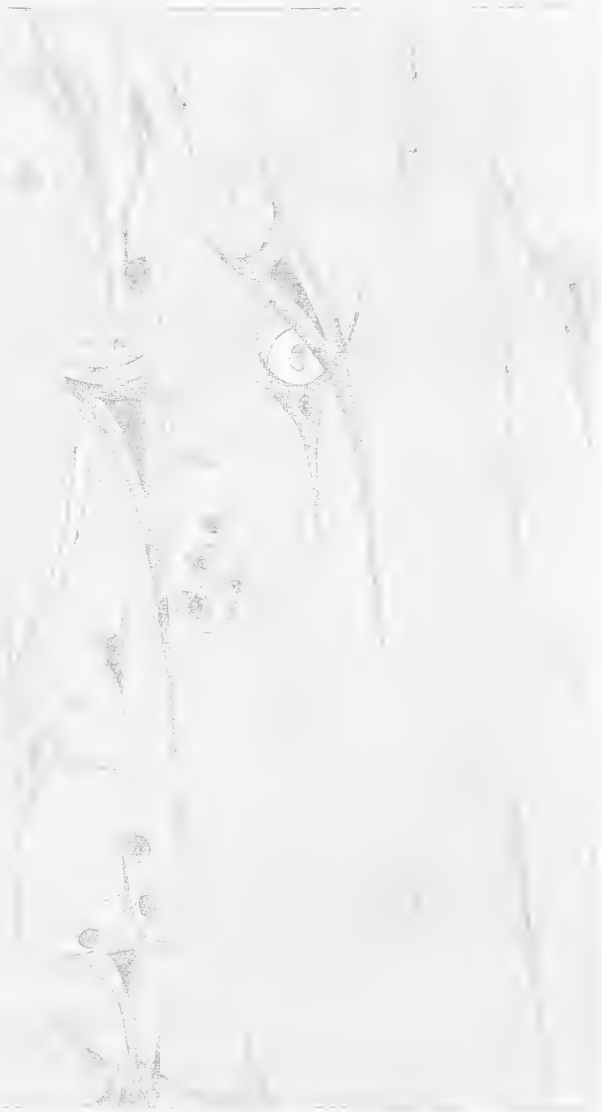


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HEADACHES



CELEBRATION OF HERBERT L. IN

1900

HEADACHES

THEIR

NATURE, CAUSES AND TREATMENT

BY

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PHYSICIAN TO THE SAMARITAN HOSPITAL FOR WOMEN AND CHILDREN

“The first requisite for success in life is to be a good animal”

HERBERT SPENCER

FOURTH EDITION

LONDON

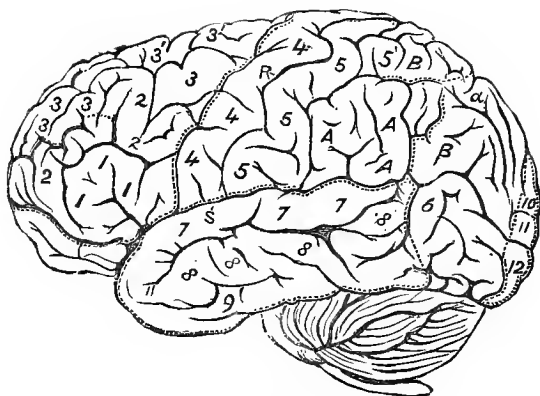
J. & A. CHURCHILL

11, NEW BURLINGTON STREET

*

1888

S



BRAIN OF MAN.

1, 2, 3, frontal convolutions; 4, 5, 6, A and B, parietal convolutions; 7, 8, 9, temporo-sphenoidal convolutions; 10, 11, 12, occipital convolutions. A is the supramarginal lobule; B is the postero-parietal lobule; and β on the bridging or annectent convolutions; R, fissure of Rolando; S, parieto-occipital fissure.

PREFACE TO THE FOURTH EDITION.



IN the publication of a fourth edition of this work, I trust that the alterations and additions made will render it more useful and interesting to the practitioner. Some parts of it have been written afresh and rearranged ; but the chief portion of the work remains in its original condition. It is a source of no small gratification to know that many cases of headache, which have defied all remedies for years, have yielded to treatment based on a correct interpretation of the symptoms. Some few observations may be made on what may be termed specific remedies for headache, which seem to me to flavour of empiricism, because it is useless to attempt to treat a headache successfully until the cause is ascertained. We are more commonly consulted for headache of a chronic form, than for acute headache which accompanies febrile and other maladies. Many chronic headaches are due to cerebral hyperæmia, to congestion, to

plethora, and to increased vascular action. Others, again, are attributable to rheumatism, gout, syphilis, and albuminuria, from the accumulation of morbid products in the blood. The morbid state which gives rise to a particular variety of headache must not be overlooked.

Headache is not always primarily a nervous affection. The brain is not disposed to take offence if the bodily functions are strong and in sound working order. But it must be admitted that there are persons who commit the greatest irregularity in eating and drinking, who are of highly nervous temperament, and yet never experienced a headache in their lives. The sympathetic system being easily upset in some persons, readily induces headache. In some it is nervous diarrhœa at the thought of a journey; in others it is cardiac disturbance; in others again, headache from dilatation or contraction of the cerebral vessels through an affection of the vaso-motor nerves.

I have alluded to headaches caused by cerebral tumours, and the relief that has been occasionally afforded by surgical operations. The subject is one of engrossing interest, both to the physiologist and the physician. I have also spoken of headache depending on strain of the eyes, and its association with errors of refraction and defective sight. This

calls for prompt attention, when we consider how zealous students, and workers in millinery suffer, and are at once relieved by the judicious selection and use of spectacles.

The merits of the hypodermic injection of morphine have been fully considered and entered into. What has been stated, will carry with it the conviction that it is a justifiable remedy in those severe forms of headache which do not yield to any other treatment ; but it is never to be lightly undertaken. With regard to the action of remedies, a large assemblage of facts and well-directed attention are needed to prove the correctness of any view taken. Sex, temperament, habits of life, climate, and varying susceptibility to the remedies employed for the cure of disease, act as stumbling-blocks towards erecting any solid structure on which to base our practice.

I have observed much the same classification of headaches as in former editions, because it has found favour with the profession generally. There are two great groups which have been pathologically dwelt upon. 1. *The headache of cerebral anæmia*, consequent upon poor and deficient blood. 2. *The headache of cerebral hyperæmia*, consequent upon an excess of blood. It is most important to keep these two great factors in mind. I think it would be an error not to make a distinction between the latter and the

headache of congestion, which is by no means uncommon in some sluggish states of the circulation and organic affections of the heart and lungs.

Although gouty headache is as strictly toxæmic as that arising from the poison of fever, syphilis, or rheumatism, I have for the same reasons devoted a separate chapter to its consideration, for toxæmic forms of headache are essentially specific, and do not come under the two great general groups.

June, 1888.

PREFACE TO THE FIRST EDITION.



IN the present day there are so many investigators in every field of study, that it would be impossible to keep pace with any branch of it, if worked out satisfactorily and to its full extent, unless we refreshed our ideas from different increasing springs of knowledge, and thought the subject over again and again from every point of view. This applies, perhaps, more to medicine than to any other subject ; for as we inquire into the origin of human maladies, new features continually present themselves, and new mysteries to be solved continually arise.

The views I have here advanced are the results of notes and observations carefully recorded by me, and extending over a period of many years. In most of the cases which have formed the groundwork of the present task, I have had ample opportunities of watching their course and progress. I have, moreover, rather relied on the investigation of facts, as

presented by the record of cases, than trusted to plausible theories. It is on actual facts I have attempted to lay the basis of the treatment and management which appear to me best adapted to meet the varieties and peculiarities of headache. In all search for truth, facts must be recognized, however they appear to contradict an apparently secure and well-established principle. To grasp the general conception and meaning of any subject in which the operations of nature are concerned, and from which a reasonable solution is expected, we must establish the conclusions which lead up to principles on the sure foundation of fact, and not, like the French philosopher, think it so much the worse for the facts if they are not included in our theory. If theory is unsupported by fact, our views and opinions entail disastrous consequences, and any line of argument we may have adopted is rendered utterly futile.

I may here remark that several works have recently issued from the medical press on the subject of headache, teeming with interest both to the patient and the practitioner. Headache has always been carefully studied in its clinical aspect, but the recent advance of physiological knowledge, as derived from experiment, has given a new and powerful stimulus to the study of the diseases of the nervous system. Not only has it furnished a stimulus, but it has tended

much to clear up our impressions as to the pathology of diseased conditions. The recognition of perivascular spaces has enabled us to comprehend how the blood supply of the brain may vary from time to time. These modifications in its physical consistency do not impair its functional activity, but promote the growth and reconstruction of the nervous system, which is undergoing incessant change and regeneration. By means of these spaces the vessels dilate without compressing the brain, and when they again contract the soft structures of the brain are sustained by the effusion of lymph without any serious consequences ensuing.

The researches of physiologists heretofore had stopped short at the cerebrum, and only comprised the deep-seated ganglia at its base ; but the recent investigations of Fritsch and Hitzig, and still more of our countryman Ferrier, have demonstrated that the different portions of each convolution possess special functions. Some are motor-centres, and others are centres of sensation. The vast additions which have been recently made to our previous knowledge by Dr. Ferrier's experimental researches justify us in drawing certain definite conclusions, not only as confirmatory of the functions of the deeper structures of the brain, but of the convolutions themselves. By applying electricity in the form of local *faradiza-*

tion to the cortical substance of the brain, he could produce at will an intense amount of *hyperæmia*, increasing the quantity of blood and the size of the vessels; and, in the case of rabbits, he found that the repeated application of the electrodes converted the cerebral substance into a condition resembling *fungus hæmatodes*. By irritating the different portions of the hemispheres in some of the lower animals, he could excite partial or general convulsion, and these were invariably preceded by a hyperæmic state of the cortical tissue. These experiments bear most strikingly on that state of nerve-tension, which Dr. Liveing describes as leading to "nerve-storms," when an explosive discharge takes place from the ganglionic centres, reducing the tension and irritability of the parts involved, while lessening the hyperæmia on which they depend. A recognition of these facts is essential to a rightful comprehension of headache. They help in no small degree to explain the intimate relation of the nerve force to the blood supply.

My earnest endeavour throughout the book has been to make it practically useful. I have adopted the division of headaches into several varieties, which may possibly seem to some readers to involve too great a refinement; but on full consideration, I think they will find it neither unnecessary nor frivolous. The diagnostic features which distinguish hyperæmia

in some of its forms from congestion and plethora are somewhat difficult to lay down, but we are most likely right in assuming that there is a physiological difference. As regards the origin of active hyperæmia, if we see the subject dimly, we are sure that its active form does not always depend upon the same pathological conditions. The cerebral tissue is over-excited and stimulated by increased cardiac action in the one case of hyperæmia ; and in the other, the hyperæmia is the consequence of relaxation of the vessels, and vaso-moto paresis. All the states depend upon an enlargement of the capillaries, either with increased activity of the general circulation, or with obstructed or retarded motion of the blood through them. Congestion, in the strict sense of the word, would seem to be the excessive attraction of blood by the tissues, rather than either the active or the passive form of hyperæmia. A hyperæmic state of the brain, when long kept up, leaves the organ weaker, and disposes it to an asthenic form of congestion. I have described passive hyperæmia and passive congestion under separate headings, and although they are in many points identical, I wish to imply by the latter a decrease in the circulating power of longer standing, a more relaxed condition of the vessels, and a greater tendency to serous exudation.

I must here express my indebtedness to Dr. Herbert

Major, the Superintendent of the West Riding Asylum, for permission to copy a plate of his, which gives the microscopic appearances of the cerebral cells of the convolutions. It is on these cells that cerebral activity depends. I also have to thank Dr. Lauder Brunton, F.R.S., for a copy of a woodcut, which renders very intelligible the association of headache with disturbance in the abdominal viscera.

10, MANCHESTER SQUARE,
March, 1877.

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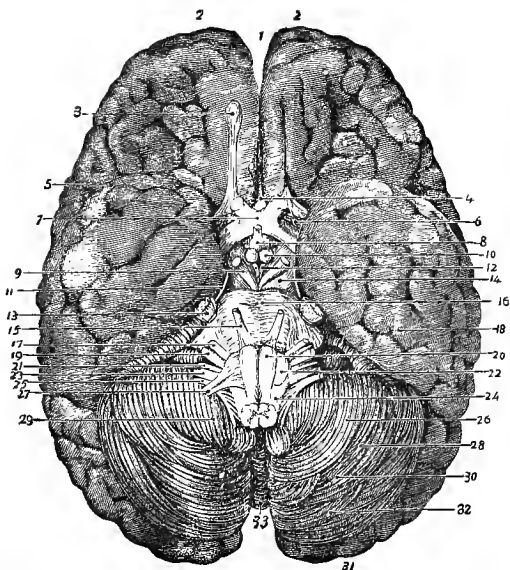
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The Base of the Brain (from Hirschfeld and Leveille).

- | | |
|-------------------------------------|---------------------------------|
| 1. Longitudinal fissure. | 18. Middle lobe of cerebrum. |
| 2. Anterior lobes of cerebrum. | 19. Portio mollis of seventh. |
| 3. Olfactory bulb. | 20. Anterior pyramid. |
| 4. Lamina cinerea. | 21. Glosso-pharyngeal nerve. |
| 5. Fissure of Sylvius. | 22. Olivary body. |
| 6. Locus perforatus anticus. | 23. Pneumogastric nerve. |
| 7. Optic commissure. | 24. Lateral tract. |
| 8. Tuber cinereum and infundibulum. | 25. Spinal accessory nerve. |
| 9. Third nerve. | 26. Digastric lobe. |
| 10. Corpus albicans. | 27. Hypoglossal nerve. |
| 11. Fourth nerve. | 28. Cerebellum. |
| 12. Locus perforatus posticus. | 29. Amygdala. |
| 13. Fifth nerve. | 30. Slender lobe. |
| 14. Crus cerebri. | 31. Posterior lobe of cerebrum. |
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| 17. Portio dura of seventh. | |

HEADACHES.



GENERAL INTRODUCTION.

MANY affections of the brain rather manifest themselves in impaired functional activity than in actual pain and suffering. Almost any change in the circulating fluid, whether it be degraded from the absorption of noxious ingredients, or impoverished by a diminution of its normal constituents, will give rise to irritation, and that altered sensation which indicates a disturbance in the sensorium.

The most typical diseases of the present day are those which affect the nervous system, and we need not travel far to ascertain the causes which produce them. The strain to which the nervous system is subjected through the requirements of modern times, renders it far more liable to disease than formerly, and men break down prematurely from overwork and the want of rest. Every branch of study is now pushed forward with a vigour unknown to our ances-

tors, and the young child is expected to grapple with abstruse questions, which a few years ago were only intended for the advanced scholar, and those who made philosophy their peculiar study. The microscope with its revelations, the electric telegraph which brings us in immediate contact with the enterprise and movements of other countries, are both powerful factors in stimulating the brain of man to unusual activity ; the conflicting theories and theological controversies that have sprung out of the discoveries which geological science has called forth, and the generally increased pace at which we live, have all tended to excite and exhaust the brain. The tide, having once set in, rolls with resistless force, and the question may be reasonably asked, where will the waves of destruction stop ? The diseases of the nervous system threaten to be the diseases of the future, as they are of the present day, in spite of any restraint which men can put upon themselves. However desirous they may be to prevent it, they are helplessly and irresistibly drawn into the contest, to struggle on and survive, or to fall early in the combat.*

* This matter has not escaped the attention of observant laymen. "The politician, the professional man, the merchant, the speculator—all must experience that strain of special faculties in the direction towards special objects, out of which comes nervous exhaustion, with the maladies consequent on over-stimulus and prolonged fatigue. Horace is a sound pathologist, when he tells us that after Prometheus had stolen fire from heaven, a cohort of fevers, unknown before, encamped themselves on earth. In our audacious age we are always

Before civilization had arrived at its present high state, the over-wrought brain was confined to men of letters, and to laborious students in the solitary contemplation of human knowledge. Nervous exhaustion was not the common disorder we now find it, and physicians were nearly silent on the causes which produced it. In whatever direction a man now turns his attention, he is sure to find competitors who are striving for the same prizes. In trade, in commerce, in literature, and in art it is ever the same—no man has the field to himself. But the professional man may perhaps be singled out as the chief example of overstrained exertion. He must strain every faculty toward the special object he is studying, and dare not leave it till he has worked it out to the minutest detail. If he does quit the field, failing to discover some new stratum, he is followed by another, who digs up the hidden treasure which gives a name or builds up a future. In the physical disorders of man a certain set of muscles require rest, whilst another set are required to perform their lost functions, and disease imitates this in the activity of certain organs, to allow the worn-out ones to recruit themselves. Rest from thought would obviate much of the fatigue and exhaustion of the brain, if it could be adequately measured and carried out ; but the circumstances of

stealing new fire, and swelling the cohort of fevers with new recruits.”
—*Miscellaneous Prose Works*, by Edward Bulwer, Lord Lytton, 1868,
vol. iii. p. 108.

life generally do not enable a man to avail himself of that change of thought and occupation which would be a safeguard against the terrible evils he is fostering.

If there be any truth in this argument, it is not surprising that the complex and delicate structure of the brain, and nerves, should fail under this continued strain and this struggle for existence in the battle of life. Every emotion, every perception, and every action operate through this vast machinery, and invest it with an importance which did not belong to it fifty years ago, when the atmosphere of thought was more serene and tranquil. What wonder, then, if the nervous system should suddenly or prematurely give way, if it has to bear a load every day, which at one time only emergency or accident put upon it! Added to the altered circumstances of modern times, care and anxiety bring their oppressive burden to bear in greater force, increasing the susceptibility of the nervous framework, and robbing it of much of its power of resistance.

Then, too, the luxuries of a larger portion of mankind have increased in a corresponding ratio; and nervous prostration is the penalty we pay for our indulgence. The sensual pleasures of life, which make such inroads on our strength and powers of endurance, are alarming to contemplate, in the varied forms of suffering which they produce in return for a passing gratification or an idle enjoyment. Sus-

tained and steady work are not the prevalent features of our present life, but laborious strain and tension, followed by brief and broken periods of repose.

In attempting to classify headaches into groups and varieties, some speculations are necessarily indulged in to establish conclusions and to support principles ; but I have endeavoured to place fairly before the reader the chief aspects of the question, and to weigh carefully in the scale of calculation every collateral sign of investigation, that fallacy may be reduced to a minimum, if not wholly got rid of, and that conviction of some sort may be gained.

It has been my desire to consider this matter in a broad light. Devotion to any view or idea gives it an ascendancy in the author's mind ; and, by attaching undue importance to it, he may be led into error. We are all, in fact, more or less disposed to incline to one side or the other, and so to entertain a prejudiced view of things, which has a cramping effect in the pursuit of a study like practical medicine. The mind is to be pitied that extends the range of inquiry no further than the sphere of its own special study, for in this way knowledge is improperly applied. "Men's thoughts," says Lord Bacon, "are much according to their inclination, and they speak as they have learned."

In the disorders we are about to consider we shall deal chiefly with those that are functional, for curable headaches cannot be strictly classified with morbid

states of the brain. And yet the difficulty is as real as it is hypothetical. Molecular changes may take place in the cerebral cells, and produce symptoms allied to organic lesions, having no show of difference except in their transient duration.

The subject of headache is of manifest importance, because it claims so many sufferers and is surrounded by so many difficulties—the pathology is obscure, the diagnosis is perplexing, the remedies are uncertain. Headache is a disorder of the utmost frequency, and yet there is none which more taxes the experience and scientific knowledge of the physician, or requires closer observation in elucidating its nature and removing its obscurity.

The habitual sufferer from headache allows no other pain to compete with it. Whether he is prostrated by its agony, or has recovered from a recent attack, he is persistent in his statement, that a continuance of the pain would rob him of all pleasure in existence. The brain shut up in its bony cavity often only reveals its morbid condition by the statements of the sufferer: in its functional derangement it does not indicate by any reliable signs whether this or that part is at fault, as in disorders of the abdominal or thoracic organs; the source of the suffering cannot be fixed upon and removed, as a decaying tooth, or a calculus in the bladder; but it goes on, and we are too often left in doubt whether the suffering has originated in the nerves and membranes of the brain,

or in some other organ of the body from reflex irritation and sympathy. Are the brain and its vessels deficient in the supply of blood? Is the circulation contributing its due supply of arterial nourishment? Or is it in excess, and are its vessels overloaded? These perplexing questions constantly present themselves for settlement. The same symptoms arise when very opposite conditions prevail. The delirium of scarlet fever is not the delirium of typhus, although it may present very similar features. There is the sleeplessness of anæmia and of congestion; and there is the coma of bloodlessness as well as of hyperæmia. How can such dangerous conditions as these be treated with any chance of success, if we have erred in the interpretation of their pathological associations, or ascribed the phenomena to a state of the brain and general system which does not exist?

Bearing in mind, then, the intricacy of the subject, and the ever-changing circumstances that surround us, we approach the discussion of a disorder which modern habits of life encourage and develop, and threaten to increase tenfold. Our system of railway travelling has no small share in producing that aching of nerves within the brain, which robs existence of enjoyment, and interrupts the serenity of social life; and which too often drives the pitiable sufferer to the brink of despair, when he finds no relief in the legitimate resources of our art. In clinging to any nostrum within his reach, he increases the

evil which is to render his life heavy and wearisome, and to baffle his energies and labours to the end.

In no class of disease do we observe better examples of *sympathetic pain* than in headache. Pain originating in one part may be transferred to another and weaker part, or to one ready to take on the morbid impression of pain. This communication is regulated to a great extent by the irritability or nervous susceptibility of the patient.

The mere idea of pain is enough to bring on actual pain in some persons; and the mind can so vivify or exaggerate it, as to give it a reality through sensation. The sympathetic pain of the shoulder from hepatic disease, the pain in the knee from hip-joint disease, the pain of the genito-crural nerve from calculus in the kidney, and the severe pain down the thigh after the removal of ovarian tumours, are all instances of reflected pain. The transference of pain beyond the seat of its production is an interesting fact in physiology, and where the impressions can be traced along a set of nerves the explanation is forthcoming. It is this communication which refers painful sensations to a distant part from which the irritation has sprung, till it finally appears to have its origin in that part, whilst the original seat of mischief is lost sight of altogether.

If, then, the cause of some headaches is traceable to a morbid sensation conveyed along a nerve by sympathetic action, it explains some painful feelings in the

head and face, through the contact of certain articles of food, and intense cold on the terminal nerves of the stomach. Any sudden shock of grief may occasion gastric pain, and it certainly awakens fearful headache in some persons. "Putting aside," says Dr. Symonds, "for the present, any reference to the patient's feelings, what do we learn from anatomical considerations as to the probable source of pain within the cranium when the person is the subject of headache? It does not appear to be in the nervous matter, whether vesicular or tubular, of the cerebral hemispheres, or of the cerebellum. No evidence of feeling has been obtained by vivisectors till they approached the sensory ganglia—the thalami optici and corpora quadrigemina. But these are the centres of sensation to all parts of the body as well as to the head. All analogy must further look for the nerves as the source of pain (though some writers are hardy enough to doubt the necessity of nervous matter as instrumental in sensation). And what are the nerves? Numerous as are the nerves which come out of the cranium, there are on a superficial view very few that go into it. A branch of the sub-occipital accompanies the vertebral artery, but a large majority of the other nerves, destined for intra-cranial purposes, are derived from the sympathetic. These, then, are the nerves which are of chief interest to our present inquiry. Nerves of this class accompany blood vessels, and when we observe the large amount of these vessels,

the brain and its membranes being more liberally supplied with blood than any other organ (the quantity being computed at as one-fifth of the blood of the whole body), we might, without searching further, feel convinced that there must be a correspondent supply of ganglionic nerves ; but the minute examination of modern anatomists has tracked them in great abundance." *

By the term headache, we mean to signify pain in the head, accompanied with intolerance of light and sound, and incapability of mental exertion ; a state, from whatever cause arising, in which the brain is temporarily prostrated and disturbed, in proportion to the cause and intensity of the suffering. Thus, many headaches depend primarily on a disturbance in the cerebral structure, on a loss of balance in the relations of the nervous force and vascular supply, or on some intricate phenomena of the mind, which increase the sensibility of the brain, and disturb its functions.† Then follows sympathetic disturbance in the digestive organs, which, reacting on the brain, increases all the symptoms for a time ; but soon, from the process

* 'Gulstonian Lectures on Headache.'—*Medical Times and Gazette*, 1858.

† "The headache, a very frequent symptom in all cerebral diseases, is very difficult to explain ; we do not even know if it is of central origin (that is, if it originates in the parts of the brain where irritation causes symptoms of pain after the insensible greater hemispheres have been removed), or whether, as I think is more probable, it depends on irritation of the filaments of the trigeminus going to the dura mater. The great sensitiveness to impressions on the senses depends on the

having advanced further, or from some change ensuing in the current of the circulation, the morbid sensibility of the brain abates, and the headache vanishes.

For some days before the development of a nervous headache, patients will admit, on close examination, that they felt easily fatigued without any real cause ; that they awoke unrefreshed in the morning, with a feeling of weight over the eyes, which passed away after breakfast ; that before the close of the day they were unusually tired, and felt on going to bed some flatulence and indigestion, with dryness of the mouth, and an extraordinary degree of depression and weariness. During the night, or the following morning, the nervous headache is developed, and after that the altered sensibility of the brain and the arrest in the powers of digestion proceed together. Symptoms, therefore, which appear as primarily indicative of disorder in the stomach and intestines, are really often secondary, or sympathetic affections, resulting from the pre-existent disorder within the brain ; and when

increase of excitability, caused by the cerebral hyperæmia, on the hyperæsthesia of those portions of the brain through which peripheral irritations are perceived. The patients do not exactly feel, see, and hear more sharply than ordinarily, but they are annoyed by irritations far weaker than such as usually annoy them. Light troubles them : a slight sound or an insignificant irritation of the nerves of touch excites disagreeable feelings. Morbid excitation (which must not be identified with increased excitability) of the same central parts causes the dazzling before the eyes, seeing sparks, roaring and buzzing in the ears, the sensation of formication, or of undefined pain, which are not induced by peripheral irritation."—*Niemeyer's Practical Medicine*, vol. ii. p. 159.

we come to consider the varieties of headache, we shall see how this disturbance is effected.

The conditions which produce some forms of headache are wrapped in mystery, and we are carried into the realms of speculation to explain them. The cranium of the adult is air-tight and unyielding. In a healthy state the brain probably undergoes neither dilatation nor compression. Neither the contents of the thorax, nor the abdomen, sustain the same amount of pressure for one second ; the elasticity of their walls through the movements of respiration keeps them in perpetual activity, and the blood pressure is continually changing ; but the case of the cranium is altogether different. Where a tumour is present, or lymph or blood is effused into the brain, there is an alteration in pressure, and the brain substance is displaced by the encroachment of disease ; but if pressure arises gradually, the brain sometimes adapts itself to the changes which are going on. In some cases of apoplexy the effusion has been so rapid and extensive, that it has pressed upon the brain, so as to cause symptoms of rapid compression and death. It should, however, be borne in mind that the phenomena of apoplexy have ensued, where nothing but a disproportionate amount of blood has been seen in the vessels and sinuses after death, without any rupture ; but then the vascular connection that exists between the vessels of the brain and those that ramify over the face and scalp has a tendency to relieve the sudden

determination within the head. The balance of the cerebral circulation is interrupted when the arteries are nearly empty, for then the veins are full, and oppression is the consequence. If arterial tension is increased, and the vessels are full, a state of exaltation and excitement then ensues, tending to delirium or mania.

There is no exact evidence of the actual change that takes place in the cerebral mass, when a physical disturbance of the brain and nervous centres is caused by simple concussion. A mere confusion of ideas, or a temporary lull in the mental process, as though the sufferer had just awoke from sleep, and had not yet realized the external world around him, are all the manifestations of the mischief. I apprehend that in these slight cases of shock, when recovery is early and permanent, there is no structural or molecular lesion; but when headache and congestion of the cerebral vessels creep on after a time, then we may calculate with almost absolute certainty that the force of the circulation through the bruised organ is disturbed, being excessive in some parts, and scanty in others.

If the delicate structure of the brain is susceptible of molecular disturbance from injury, it is a rational inference to suppose that the same may occur from functional disorder and perverted nutrition, when they have been of long standing. A structural lesion at the base of the brain is possible where the vascular supply is the greatest, and the minute filaments of

the pneumogastric nerve are abundant, as they spring from the medulla oblongata. Now, in concussion of the brain the enlightened surgeon, in his treatment, relies more on rest and the exclusion of light and sound, than on any other method of cure. He knows that any plan which does not include these instructions is futile to effect recovery, and to afford the brain a chance of regaining its equilibrium. If it is not allowed a long season of repose, and strain and exertion are put upon it at a time when the utmost quietude is demanded, then inflammation, softening, and gradual degeneration are established.

The brain cannot stand still like a monument, and maintain its integrity. If there is no repair, then there is degeneration; the morbid condition, instead of subsiding, slowly advances, and the rest, of which sleep is the most perfect form, cannot bring its restorative influence into operation; the nights are disturbed and restless, and dismal dreams announce that the morbid changes are still in progress. Repair proceeds with activity in persons of adult life, when growth has ceased and the bodily framework is stationary; but in children, when the tissues are building up, and the changes are rapid in all the organic functions, recovery is often tedious, defective, and uncertain. In these young patients a shaking of the cerebral mass has laid the foundation of confirmed headache, and subsequently of organic change in the structure of the brain, sometimes leading to

exudative products and morbid growths. Repair is one of the most beneficent manifestations of the goodness of the Creator: by the sorrow and pain which nature inflicts for the disobedience of our acts, in the violation of the laws which she has instituted for our observance, she stays the progress of disease and injury, permits the restoration of the wasted tissues, and, by a period of calm repose, evokes that growth and repair which obviates permanent harm, and furnishes the conditions requisite for the restoration of perfect functional activity.

CHAPTER I.

THE HEADACHE OF CEREBRAL ANÆMIA.

Physiology of the Cerebral Circulation—Effect of the Cerebro-spinal Fluid in Influencing the Circulation—Perivascular Spaces—Cerebral Anæmia and the Sources of Blood Supply through the Circle of Willis—Relation of Anæmia to Coma—State of the Brain in Sleep—Experiments of Mr. Durham—Physiological Considerations and Conclusions—Symptoms and Diagnosis—Prognosis and Treatment—Physiological Action of Alcohol in Cerebral Anæmia, and its general Effects and Consequences on the Animal Economy.

Cerebral Circulation.—Before we can comprehend fairly what is nervous pain, it behoves us to glance at the peculiarities of the cerebral circulation, and the relationship existing between the nervous tissues and blood vessels.

In a young child, with its open and elastic fontanelles, the amount of blood within the cranium is subject to great variation, because the skull is not quite closed by bone, and the cerebral circulation is obedient to the same laws as regulate the circulation in the rest of the body. In adults, as we have seen, when the ossification of the skull is complete, and the

pressure of the atmosphere on the brain no longer exists, the variation in the contents of the cerebral vessels is relatively diminished ; but the ventricles and subarachnoidean fluid keep up a tolerably uniform pressure ; and where the cerebral substance is diminished in volume from any cause, the fluids and blood in the vessels prevent that difference from taking place, which is so common in the other great cavities of the body.*

The experiments of Sir George Burrows and others prove that the quantity of blood within the cranium is subject to considerable variation, and consequently

* "There can be no doubt that the most important influence modifying the amount of blood in the brain is the fulness of the ventricles and other cavities of the subarachnoid spaces, and of the lymphatic 'spaces' or sheaths surrounding the cerebral blood vessels, all of which spaces contain a watery fluid identical with the cerebro-spinal fluid, and all communicate with one another. Their fulness, as said above, holds a precisely converse relation to the amount of blood in the brain, a fact which has been established with regard to the perivascular spaces by exact measurements, it having been found by Golgi that they are larger in all conditions of the brain accompanied by anæmia, and smaller in hyperæmic conditions."—*Jones & Sieveking's Pathological Anatomy*, by Dr. Payne, p. 254.

"In almost all autopsies it may be seen that the amount of blood contained in the vessels and the amount of cerebro-spinal fluid are in inverse proportion ; that a distension of the vessels of the meninges is accompanied by a decrease of arachnoid fluid, and conversely that when the vessels are less full, the meshes of the *textus cellulosus subarachnoidealis* contain a greater amount of serum. Only when the brain is atrophied do we find œdema of the membranes with overfilling of the vessels ; and only when an effusion of blood, a tumour, or a collection of fluid in the ventricles has contracted the space in the skull, do we find, along with anæmia, dryness of the membranes and disappearance of the sulci between the cerebral convolutions."—*Niemeyer's Practical Medicine*, vol. ii. p. 150.

the pressure exerted on the nervous structure would be considerable also, if it were not for the arrangements of the lymphatic system within the encephalon. Dr. Symonds and Mr. Mitchell Clarke* conducted some careful experiments which confirmed those of Sir George Burrows, who proved that gravitation affected the quantity of blood in the brain. These gentlemen selected three rabbits—one rabbit was suspended by the hind-legs, another was suspended by the ears and forelegs, and a third was kept in a horizontal position. "The two suspended rabbits were poisoned with prussic acid after about half an hour, their positions having been strictly maintained. The post-mortem examination was made immediately, and with the bodies kept steadily in the same position."

The rabbit suspended by its hind-legs was found to have its eyes congested, and the tissues of the head and neck gorged with blood ; but the substance of the spinal cord, and the lumbar and dorsal regions were pallid, the bony tissue of the cranium and the meninges were highly congested, and the puncta vasculosa in the cerebral substance were numerous. The ventricles contained no fluid, and there was none external to the convolutions. The rabbit suspended by the ears and forelegs was found to have its head, neck, and back exsanguine, whilst the lumbar region was full of blood.

* Symonds 'On Headache.'—*Medical Times and Gazette*, April 3, 1858, p. 34.

No serous fluid was found in the ventricles, or between the convolutions. The brain and membranes were as blanched as those of an animal bled to death. In the third rabbit, not suspended, also poisoned by prussic acid, and examined in the horizontal position, there was an equal distribution of blood, and nothing remarkable beyond the absence of cerebro-spinal fluid in the cranial or vertebral cavity.

In a full-grown and strong rabbit, suspended by the ears and forelegs, death occurred in an hour; another strong middle-sized rabbit, hung up by its hind-legs for four hours, recovered itself almost immediately, and began to feed heartily. We see that the congestion of the brain and membranes produced no ill effects comparatively, whilst the opposite position was quickly fatal.

These experiments corroborate what we know of the rapid congestion of dependent parts after death, and of the tendency to hypostatic congestion of the lungs and brain in fever and other exhausting diseases.

It has been satisfactorily demonstrated by the experiments of Sir George Burrows, A. Durham, Hilton, Kussmaul, and Tenner, and other observers, that there is vascularity of the encephalon during excitement and mental strain; while during sleep and exhaustion, the vessels lose their turgidity, and the brain is pale and bloodless. These changes are owing to the presence of the cerebro-spinal fluid, on

which Mr. Hilton has laid so much stress. When it is in excess the vascularity is slight, and when it is diminished the turgescence is increased (Rest and Pain). Not only is there a relation between the intra-cranial vascularity and the cerebro-spinal fluid, but there are channels in the substance of the brain, termed by Robin, His, and Obersteiner, "perivascular spaces," along which the blood vessels travel; and these are invested with a loose sheath of connective tissue, within which is found a watery fluid, regarded by some as lymph.* When the brain is active the vessels dilate, and the fluid is absorbed, without causing any compression of the nervous structure; but when this activity has subsided the vessels undergo contraction, and the space between them and the perivascular space is again filled with fluid.

Cerebral Anæmia.—In order to approach anything like an explanation of the different forms of headache, we must arrive at some definite conclusions regarding the quantity of blood within the brain, and how anæmia is brought about when the supply is deficient or its quality altered. It is computed, as we have before noticed, that the brain receives fully one-fifth of the whole blood in the body (Haller), a circumstance which irresistibly betokens its immense vigour and activity, and connects it with consciousness, and thought, and feeling—in fact, with all the higher

* *Frey's Histology*, by Barker, p. 577.

attributes of the mind of man.* In no organ of the body is it more essential that blood should be freely supplied than to the brain, if its functions are to continue active and energetic. The immense pre-eminence assigned to it as the mental organ seems naturally to require an abundant vascular supply. Mental changes and nervous waste are perpetually going on, and under the influence of strong emotion or excitement, products are removed from the system by the skin and kidneys in excess of what ordinarily occurs. Especially is this the case in the amount of phosphates excreted. I have known patients of advanced years to have their urine loaded with phosphates, when they suffer from headache and confusion of ideas induced by mental strain. A period of rest and repose was followed by disappearance of the headache and confusion, and the establishment of a natural state of urine.

In the brain the demand for healthy blood is twofold. In common with all the tissues of the body, it requires a due supply of nutrient material for the maintenance of its structural integrity and functional efficiency, but a more urgent demand is for the oxygen which is conveyed by the hæmoglobin of the red

* "In the performance of an idea, as in the performance of a movement, there is a retrograde metamorphosis of organic elements; the display of energy is at the cost of highly organized matter, which undergoes degeneration or passes from a higher to a lower grade of being; and the final retrograde products are, so far as is at present known, somewhat similar in muscle and nerve."—*Maudsley*.

corpuscles. Oxygen is absolutely necessary for the evolution of nerve force in all its forms. It is the absence of oxygen from the blood in the cerebral capillaries which causes death to occur in cases of suffocation in three or four minutes ; and consequently it is probable that a deficiency of it must impair the activity of the nerve elements of the brain.

Whenever the red corpuscles with their constant supply of oxygen are not passing through the capillaries of the brain in sufficient number we have cerebral anæmia. This may also be due to the state of the blood itself, as in anæmia and cachexia, when the corpuscles counted by the method of Hayem may be reduced to less than half their proper proportion. Or the blood itself may be of due composition, but virtual cerebral anæmia may arise from weak action of the heart, functional or organic in origin, through the slow transmission of the blood along the vessels. Or, again, the cerebral blood vessels may be diseased, and obstruct the passage of the blood by loss of elasticity, or actual narrowing. This is the great cause of the cerebral anæmia of advanced life.

Deficiency in the circulation of the brain will gradually enfeeble the mind, and lower all the functions of the body. We may witness this when there is any drain going on from the system, as in hæmorrhoids, menorrhagia, or profuse leucorrhœa. If the blood is wanting in certain constituents, or is contaminated by the presence of others which it ought not to possess,

then the mental faculties are clouded and depressed, and the brain indicates disorder. This is remarkably well exemplified in the cachexia of syphilis, and in blood-poisoning from lead, copper, or mercury. The persistent use of alkalies has an equally injurious effect. I am sure I have seen the disposition to cerebral anæmia accelerated by the prolonged use of alkalies and mercurial pills, which some people take to excess because they fancy the liver is disordered, and the brain confused in consequence. They may afford relief for a time by relieving the torpor of the internal organs, to which an enfeebled circulation tends, but the system invariably fails in the long run. The same happens in the acute fevers, when the red corpuscles undergo disintegration, and the vital properties of the blood are profoundly disorganized. When the supply of healthy arterial blood is sufficient, and the cerebral circulation is stimulated to activity, the thoughts are quick and bright, and the pleasure resulting therefrom is uniform and consistent. But when the flow of blood is unusually rapid, and the vessels are distended and throbbing, then mental excitement ensues, and a disorderly succession of perverted thoughts and exalted intentions arise, which are all created by a disturbance in the balance of the circulation.

The "rush of blood to the head," which some people feel when they are the subjects of cerebral anæmia, is to be thus explained :—Emotion or sudden excitement causes the arterial circulation to become quicker, and

this fills the cerebral vessels too suddenly with blood for the brain substance to bear it with composure; besides, the venous circulation is slow, and unable to respond to the call at once.

The unconsciousness which accompanies syncope, or fainting, takes place when the heart's action is failing or feeble, and the cerebral functions are no longer stimulated by the usual flow of arterial blood. When animals are bled to death, or when ligatures are placed upon the common carotids, convulsions, and anæmia of the brain, are the immediate sequences. It is obvious that this shutting off of the arterial current from the brain, resembles in the effects produced, the symptoms of an apoplectic clot, or the obstruction due to embolism. The surface is pallid, the pulse quick and small, the temperature occasionally rises from the irritation induced, and the muscular relaxation is complete. With the appearance of pallor, associated with mere deficiency in the arterial blood supply, there occur headache, loss of memory, petulance and irritability of manner, and indifference to all those subjects which ordinarily possess interest. The brain is badly nourished, and it refuses to respond, for the nerve centres have lost their tone. The patient lies exhausted in his bed, with slow and feeble respiration, and dilated pupils. If the veins are full, and there is fear or terror, the features may be livid and cold from the effect on the sympathetic system, and, through it, on the ventricular contractions of

the heart. The pallor of the eye and its dead calm present a striking contrast to the red and eager eye of hyperæmia. There is often the blank waxen look of despair, with the angles of the mouth drawn down, as though the patient had passed days together in solitary grief. He is frequently restless, unreasonable, and fidgety, and moves spasmodically from one part of the room to another, like a man whose mind is ill at ease, and stricken with remorse. Now he feels his pulse, now he consults his tongue, and if he has the sensation of numbness or cramp in his legs he dreads the approach of paralysis. If his attention is directed to his head, as the possible cause of his discomfort, he fears the approach of a fit of apoplexy, and is afraid to be alone. In women the condition is more passive.

To keep the brain and the mind in proper working order involves other considerations: it demands a discipline of life which few persons can or will carry out. Their ordinary habits are provocative of change in the nervous tissue, through the stimulants they daily consume, or the laborious life they are compelled to lead. Mental effort is incompatible with muscular strain, and if both are attempted at the same time, the supply of blood to the brain will not be maintained, and the tissue will suffer from innutrition. Local congestions overloading some portions of the cerebral mass, and obstructing the free current of blood to other portions, may be the beginning of that anæmia

which is so frequently the starting-point of some headaches. I repose here on the rationality of a theory of ill health and disease, which, beginning in anæmia and tardiness of circulation, ends by a series of consecutive changes in impurity of the blood itself. A vital fluid so contaminated destroys at length the vigorous action of the various secretory and excretory organs of the body, heaping upon them work which they cannot discharge, and leading to morbid changes of structure. Recent microscopical research has fully demonstrated the exactitude and certainty of the lesions in paralysis, and an endless variety of other forms of disease, when no alteration is visible to the naked eye. During life, the symptoms may indicate grave cerebral lesions, yet, after death no changes may be found beyond those observed in cerebral anæmia from one of the causes already mentioned. It is uncertain as to how pressure, or diminution of pressure, exactly influences the cerebral functions. We know, however, especially from clinical observations, that cerebral anæmia is a frequent cause of headache. And this anæmia may be produced by a deficiency in the supply of blood, by a diminution of the corpuscular elements, or by a profound alteration in their composition.

Anæmia is, indeed, a most important cause of headache. In a post-mortem examination of a case of anæmia, where headache had been a prominent symptom, we might expect to find that the brain

presented a pallid appearance, and the puncta vasculosa were absent or ill-marked. There would be an excess of fluid in the ventricles, and the convolutions would be flattened from pressure due to the intraventricular exudation. The meninges would thus be involved. And here I may observe in passing, that some pathologists are of opinion that pain in the head is a positive indication that the meninges are involved, and that when they are free from pressure or inflammation there is an absence of suffering.*

In order to understand the subject of anæmia and hyperæmia, it is important to glance at the circulation of the vessels at the base of the brain, and to see how freely they are united at their sides and in the middle line. The vascular supply is enormous, and nature has provided a free circulation of blood through the brain, notwithstanding that a large vessel might be obstructed altogether. I think the pain of occipital headache is sometimes induced by an augmented local blood supply, for the basilar artery formed by the union of the two vertebral arteries supplies half the encephalon with blood; viz., the medulla oblongata, the pons, the cerebellum, and the posterior third of the cerebrum (Ellis). The anterior portion of the cerebrum is supplied by the internal carotid, which divides into the anterior and middle cerebral, and the posterior communicating artery. Further, according to the researches of Duret and Heubner, the great

* See the chapter on Organic Headache.

arteries which supply the brain are divided into two distinct series: first, the central system of arteries which comprise those vessels destined for the supply of the great central ganglia; and secondly, the cortical system, which includes the vessels for the grey matter of the convolutions, and subjacent white matter. These systems are in a certain degree distinct, the vessels which unite them being few in number, and of extremely small size. And not merely are the cortical and central systems distinct, but the branches of the various arteries are also limited into distribution to distinct areas, and the inosculations between the arteries of adjacent areas are very few in number, small in size, and only occur at the periphery of such areas (Duret, *Archives de Physiol.*, 1874; Heubner, *Centralblatt für die Med. Wissench.*, 1874). This anatomical peculiarity of the vascular supply to the brain is sufficient to account for the existence of localised headaches.

Of the state of the circulation generally in cerebral anæmia, we may observe that the very opposite conditions exist to those present in hyperæmia, where the vascular supply is well maintained and the cerebral cells are active. In anæmia the heart's impulse is weak, and the sounds are short and indistinct—the area of dulness being sometimes increased from dilatation of the ventricles. There may be fatty degeneration of cardiac muscular structure; the pulse is feeble and easily compressible from the unfilled

state of the arteries, and the general diminution of blood in the vascular system.

I shall allude further on to local hyperæmia—to one part of the brain being more full of blood than another. In cerebral anæmia there is the same unequal distribution of blood, one portion being more exsanguine than another (except at the base of the brain in the so-called circle of Willis just described), because the cerebral arteries have no communication one with another, and the different vascular areas are distinct and independent. On a little reflection, it becomes at once evident that the circulation may receive a check in some part of its curious bendings, and proceed unhindered in others. The different areas of the brain being irregularly supplied with blood, it is clear that the unequal distribution not only causes headache of a nervous type, but gives rise to a perverted or morbid condition of the emotions—to melancholy and suspicion, to distrust and apprehension. And it also fully explains the effect of posture in relieving or aggravating cases of headache. There are persons who, when suffering from agonizing headache, cannot rest their head on a pillow, for even a moment, without the face becoming flushed, and the brain throbbing to the verge of delirium; because the egress of blood from the overloaded vessels is not aided by gravitation, and an excessive supply is maintained by the recumbent posture.

Chronic cerebral anæmia, and the headaches that

result from it, are to be regarded with anxiety in those persons whose nervous system is hereditarily weak, and whose minds are vacillating and unsteady. A headache of thirty years' continuance is apt to produce permanent change in the temper and feelings, and to diminish the powers of the mind. The fear that organic disease should be developed after a period of depression which has succeeded to pain and suffering, through irritation of the membranes and nervous centres, is a natural one, particularly if hallucinations are present, and the patient has a fixed idea that he has sustained injury or wrong.

It would be an error past redemption not to connect physical disease with mental disease. How often does not the first induce the last, and the last the first? Perverted sensation eventually implicates the action of the cerebral cells, and by its agency brings about irretrievable mischief in the structure of the brain, if not disease of the blood vessels themselves. The brain assumes an altered appearance ; it becomes atrophied and sodden, and the convolutions shrunken and undeveloped. The patient's gait and wasting motor power in the lower extremities accompany the intellectual decay, and he readily succumbs to the influences of intercurrent disease. Sleep is broken and nutrition is further checked ; for the unrested brain cannot fulfil its functions, or repair the waste of its tissue. Disturbed dreams supplant repose, and morbid changes pursue their downward progress.

Mr. Durham has conducted some interesting experiments to prove that in sleep, when the brain is at rest, it is anæmic, and no longer requires its accustomed arterial stimulus.

Hitherto it had been generally supposed that the brain was lulled into quietude during sleep by an overcharged state of the cerebral vessels—that congestion and a large blood supply were most favourable for repose and rest; but the facts adduced by Mr. Durham proved the soundness of his conclusions, and they have since received the testimony of other competent observers. Mr. Durham supports his views by the following experiment :—

“A dog having been thoroughly chloroformed, a portion of bone about as large as a shilling was removed from the parietal region of the skull by means of the trephine, and the subjacent dura mater partially cut away. The portion of brain thus exposed seemed inclined to rise into the opening through the bone. The large veins over the surface were somewhat distended, and the smaller vessels of the pia mater seemed full of dark-coloured blood; no manifest difference in colour between the arteries and veins could be perceived. The longer the administration of the chloroform was continued the more ^{the} distended did the veins become. As the effects of the chloroform passed off the animal sank into a comparatively natural and healthy sleep. Corresponding changes took place in the appearance of the

brain ; its surface became pale, and sank down rather below the level of the bone ; the veins were no longer distended ; a few small vessels, containing blood of arterial hue, could be distinctly seen ; and many which had before appeared congested, and full of dark blood, could scarcely be distinguished. After a time the animal was roused ; a blush seemed to start over the surface of the brain, which again rose into the opening through the bone. As the animal was more and more excited, the pia mater became more and more injected, and the brain substance more and more turgid with blood. The surface was of a bright red colour ; innumerable vessels, unseen while sleep continued, were now everywhere visible, and the blood seemed to be coursing through them very rapidly ; the veins, like the arteries and capillaries, were full and distended, but their difference of colour, as well as their size, rendered them clearly distinguishable. After a short time the animal was fed, and again allowed to sink into repose ; the blood vessels gradually resumed their former dimensions and appearance, and the surface of the brain became pale as before. The animal slept in a perfectly natural manner. The contrast between the appearances of the brain during its period of functional activity, and during its state of repose or sleep, was most remarkable. In order, however, to be quite sure that I was not misled by fancy, nor yet by faulty memory, but that the difference was really great, I

operated on two animals, and kept them alternately in different states. The animals being placed side by side, the appearance in the two cases could be satisfactorily compared." *

When the functions of an organ are active and energetic it is freely supplied with blood, and when it is sluggish and anæmic it receives a small amount of blood. But even this view is not altogether satisfactory, and we are bound to concede some relationship between the blood and the tissues themselves. There is an attractive force between them. Some organs draw more blood towards them in disease than is the case with others, and this is well shown in remittent fevers and ague, where the mere contraction or dilatation of the blood vessels through the vaso-motor nerves cannot account for it.

The diagnostic symptoms that belong to cerebral anæmia are those we might expect to arise from a weakened brain circulation. There are fits of depression and lowness of spirits ; and yet these are not continual, for the patient may be roused to a renewal of his accustomed efforts, and temporarily forget his ailment altogether, if it has not assumed a serious aspect. The patient is fearful and timid, and has a general dread of things and of circumstances never likely to happen ; he is over-anxious to put his worldly affairs in the best possible security, lest ill-

* 'Physiology of Sleep.'—*Guy's Hospital Reports*, vol. vi. 1860, p. 153.

ness should overtake him suddenly ; and he would like to make such stipulations for the future as shall overrule the liberty of his successors, and control the ever-changing events of life. Sleeplessness is not an uncommon symptom, but many patients pass sound nights, and in the daytime become drowsy and fall asleep in the chair, or whilst travelling in a train ; and this, according to my experience, is most frequent before the brain has passed into the condition which produces actual headache and overpowers the reason.

The pain is most frequently *vertical* ; it occupies the top of the head, which feels hot and burning to the hand. The pain is not throbbing, or bursting, but of a gnawing, scraping character. It may be also frontal, or occasionally occipital, and present most of the characters of nervous headache. The headache of intellectual strain, and severe gastric disorder from over-indulgence in alcohol and high living, is almost invariably *frontal*, and the veins about the temples and forehead are full, and the face is flushed. In anæmic headache there are noises in the ears, dizziness, and flashes of light before the eyes, especially where losses of blood have taken place, and there is also pallor of the skin and lips. Swooning and twitching of the muscles are also common.*

The patient does not resign himself so completely

* See Chapter XIII., on Organic Headache, concerning the seat and character of the pain.

to his misery in this variety of headache. In the earlier stages of the attack, at least, he is more anxious about his fate, and when he is likely to be well again. When the attack is threatening, he is unusually fidgety and exacting, and exhibits a querulousness which is most trying to contend with.

The tongue is furred at the back, if the pain has been of any considerable duration, and there is flatulence, nausea, and constipation. The colon is loaded and torpid from deficient muscular contraction, which is common in all forms of impaired functional activity of the brain ; indeed, the one often induces the other. The pupils are sometimes dilated, but frequently they are of medium size, and, according to my experience, when the pain is vertical the pupils are oftener contracted, a symptom which I attribute to meningeal irritation. The ophthalmoscopic signs reveal pallor of the optic discs and dulness of the choroid. The blood vessels of the retina are generally thin and few, and the optic disc is of a pale and waxy white hue, which is common to an impeded circulation through the brain, and to anæmic conditions generally. The eyes are sunken in the orbits, and the pulse is slow, laboured, and languid. In a patient recently under my care the pulse did not exceed fifty-four beats per minute during the continuance of the headache and exhaustion. In this case there was some dilatation of the left ventricle and enlargement of the heart chiefly due to fatty change. In the majority of cases the

pulse is weak and small, owing to the unfilled state of the arteries, and the diminished quantity of blood throughout the vascular system. Slight pressure obliterates the pulse altogether, and sometimes it can scarcely be felt. In other cases the pulse, in addition to being small, is habitually rapid, and the heart's impulse weak and jerking against the thorax. In the case of a patient who was exhausted from menorrhagia, the pulse averaged 120 for weeks together; the skin and mucous membranes were markedly blanched, yet there was no headache to speak of, and no cardiac murmur to be detected. Occasionally a shooting neuralgic pain was referred to the right eye and temple, but it was never vertical, and the severity was greatest some months before admission into hospital, when the hæmorrhage became sudden and profuse.

In the headache of cerebral anæmia, of which the nervous form in delicate women is a good example, the feet and hands are cold, and the surface of the skin generally is dry and often gelid. The gloomy thoughts and wretchedness incident to this anæmic state, too frequently induce a desire for alcoholic stimulants, which slowly steals on, and the patient, who through life may have been most temperate, may resort to this indulgence till it merges into a miserable habit, and destroys the power of digestion by taking away every remnant of appetite. It is a passion hard to overcome, because it gives temporary relief

by dilating the vessels of the brain, and increasing the force of the heart's contraction. So far there is relief; but when this effect has subsided the depression is all the greater, and the headache is increased tenfold.

As to prognosis, recovery is certain if the pain is due to curable conditions, and the system has not been reduced too low. We observe this over and over again in young women who are exhausted by prolonged lactation and hard work, or who have had miscarriages, or been drained by leucorrhœa. When the habits of life can be changed, and the patient is able to avail herself of rest and proper hygienic measures, her debility and headache gradually pass away, as the brain is better nourished. If the condition is incurable, and complicated with organic disease, the headache will persist; and instances of this kind are to be seen among the poor, where all the surroundings are wretched and deplorable.

Treatment.—With respect to the treatment of the headache of cerebral anæmia and exhaustion, it is obvious that this must depend on the peculiarities and special symptoms of each individual case. In addition to the distraction and pleasant society by which the current of gloomy thoughts should be turned aside, and in order that gleams of joy may break upon the patient's path, and disperse those heavy clouds of sadness which add to the depression of the disease, the medical treatment consists in

endeavouring to restore the tone and quality of the blood, that the cerebral tissue may be better nourished. The cause must be ascertained, and removed if possible. Where men have subjected themselves to great intellectual strain, rising early and going to bed late, there will be no chance of recovery till these habits are given up. Men so circumstanced only keep themselves going by irregular living, and a too free use of stimulants. If with this high pressure there are pecuniary anxieties and heavy responsibilities, and the patient has no alternative but to remain at his post, he is certain to break down. Entire cessation from work, and absolute repose and quiet for a few months, or a year, may restore the brain and enable the patient to resume his duties in moderation. Discharges of all kinds should receive prompt attention, as in menorrhagia and leucorrhœa; and derangement in the assimilative functions should never be overlooked. This last indication for treatment is most important. A practice too often followed is to prescribe for the symptom of headache without ascertaining its cause. Some patients, especially women, are singularly reticent about hæmorrhagic discharges. The state of anæmia and headache may be induced, for instance, by a bleeding rectal polypus, or uterine fibroid. Here surgery comes to our aid, and in checking the hæmorrhage, removes the source of anæmia, and the symptoms of that condition pass away. The tonic effects of arsenic are invaluable

(Form. 7-8), and iodide of potassium is indicated if there is a syphilitic taint ; in fact, those remedies will be serviceable which increase vascular tension, and accelerate the flow of blood in the encephalon. In gouty conditions, colchicum and the alkalies will be useful to remove the *materies morbi* and the products of tissue metamorphosis. If depression should threaten, the addition of carbonate of ammonia will be found useful (Form. 31-32).

Opium is a remedy which, when given in small doses, increases the force of the heart, and produces a soothing influence on the system generally. If employed in combination with a stomachic or aperient, I have never known it to do harm ; but if pushed to narcotism, it loses its sustaining power, locks up secretion, and becomes depressing. I have given it with advantage in half-grain doses, with three grains of powdered rhubarb, at bedtime, in the form of a pill (Form. 102). It has composed the patient and relieved the cerebral discomfort. By restricting the wear and tear of tissue, it increases in some unexplained manner the nutritive processes, and is of service in allaying the extreme restlessness and disquietude which are attendant on the anæmic condition.

Dr. Anstie remarks that the soporific effects of opium are not the most remarkable on the system. "In the countries where opium is indigenous, it is an article in daily use with the great majority of the population, by whom it is employed for a very different

purpose than that of procuring sleep ; in fact, as a powerful and rapidly acting stimulant. . . . When the opium acts efficiently, not a trace of narcosis can be perceived ; on the contrary, the vital powers are distinctly raised." *

The ammonio-citrate of iron is one of the best hæmatinics in the whole pharmacopæia, and is a very valuable drug in combination with the bromides of potassium or ammonium, when it cannot be safely administered alone (Form. 71). But the sudden filling of the cerebral vessels is always to be kept in mind, and regarded with apprehension.

The carbonate of iron in considerable doses is also useful. Whatever preparation of iron is selected by the practitioner, the value of free dilution should ever be borne in mind. A large dose of iron diluted with half a pint of spring water will be tolerated by a patient who could not bear half the dose in a concentrated form. In this way it is rapidly absorbed into the blood, and the complaint so often heard from patients that it increases their headache is quite avoided.

Digitalis is another remedy to be relied on when the heart's action is weak ; it appears to strengthen the contractions of the ventricle, and to render them more uniform and regular : hence it is of value in weakness or dilatation from any cause, when given in small doses. In anæmia, where the blood supply to the brain is not enough for the purpose of nourishment,

* *On Stimulants and Narcotics*, 1864, pp. 147-150.

it increases arterial tension, and thus it becomes of as great service here, as it is detrimental in hyperæmic conditions, and where the arteries are changed from atheromatous disease. Digitalis is of no use in anæmic headache, except for the effect it may have on the circulation through the heart itself: a slow pulse, which is often attendant on this condition, contra-indicates the use of digitalis.* I believe that its good effects in these cases are often obtained by combination with a few drops of spt. chloroform (Form. 49-50). The fresh infusion is the best preparation (Form. 51), and next to this I prefer the powder, with a grain of sulphate of iron (Form. 103). In giving the tincture, it is well to commence with five minim doses, and gradually increase it to one drachm. Both experiment and observation go far to prove that reduction in the frequency of the heart's action takes place through the influence it exerts on the pneumogastric, whilst it also has some effect through the cardiac

* The experiments of Brunton, Gourvat, and Traube conclusively establish the fact that moderate doses of digitalis produce a rise of arterial pressure, with diminution in the frequency of the pulse. Dr. H. C. Wood sums up the action of the drug in the following propositions :—

1. Digitalis in moderate doses stimulates the musculo-motor portion of the heart ;
2. Increases the activity of the inhibitory apparatus ;
3. Causes contraction of the arterioles.

As a consequence of the first action, the cardiac beats are stronger ; as a consequence of the last, the blood channels become narrowed, and the blood in its passage through them, meeting with increased resistance, assists in slowing the pulse.—Dr. H. C. Wood's *Therapeutics*, 1876, pp. 133, 134.

ganglia in increasing the force of the heart's contractions, and causing arterial tension. In this way, the arteries becoming fuller and acting with increased energy, the blood is propelled with greater vigour into the veins. Tea, coffee, and quinine act in a similar way.

Belladonna, according to Dr. J. Harley, is another heart tonic, though it is said to weaken the muscular power generally, and to cause confusion of ideas, headache, giddiness, and singing in the ears.* It therefore requires to be used with caution, and I should not be disposed to include it among the remedies for this condition. While strychnia dilates the spinal blood vessels, belladonna does the same for the cerebral vessels; but it seems to me that as it increases

* "Harley has found that after the administration of a moderate dose of belladonna the arteries are contracted; but that when a large dose is given, the contraction is replaced by dilatation. The primary contraction is due to stimulation of the sympathetic system, and the subsequent dilatation to the exhaustion resulting from the previous overstimulation."†

I ordered one grain of the extract for a patient who had dysmenorrhœa, in the form of a pill, three times a day, and it produced severe frontal headache and dimness of vision, so that she could not see ordinary-sized print: the face was hot and flushed of a crimson hue, and the pupils widely dilated, which gave her a squint and a strange staring look. There was loss of appetite, and difficulty in swallowing from contraction of the pharynx; the girl was very tremulous and agitated, and her sleep was disturbed and broken by horrible dreams. Although she only took three pills altogether (one daily for the first three days), the toxic symptoms did not pass off completely till the ninth day.

† 'On a Case of Diabetes Insipidus treated by Belladonna and Ergot,' by W. Murrell, L.R.C.P.—*British Medical Journal*, January 1, 1876, p. 9.

the force of the arterial current, it may be profitably employed in some cases (Form. 52-104).*

I have seen good effects follow the use of phosphorus in doses varying from gr. $\frac{1}{60}$ to gr. $\frac{1}{32}$: (Form. 89), daily after luncheon, while the hypophosphites of lime and soda have been given in calumba morning and evening (Form. 28).

The headache of cerebral anæmia is said by Dr. Smith to be often mistaken for the passive congestive form, and to occur in enfeebled heart power, and enlargement with dilatation and fatty degeneration. "Nitrate of amyl will relieve the intermediate headache. Let the patient inhale three to five drops of it on a piece of cotton, placed within one nostril, while the other is held closed."† When this headache is associated with nervous exhaustion, as it very commonly is, he recommends a combination of strychnia, iron, and gentian (Form. 53).

Vomiting, swooning, and faintness are common in cerebral anæmia, and the patient, in a well-marked condition, cannot remain in an upright posture without risk of syncope. The vaso-motor system is relaxed and the heart's action depressed. The blood suddenly flows back from the arteries, and their elasticity is not brought into play. Consequently

* See Chapter VII., on Neuralgic Headache.

† 'The Therapeutic Effects of Headache,' by A. A. Smith, M.D. A Lecture delivered at the Belle Vue Hospital Medical College.—*London Medical Record*, September 15, 1876, p. 392.

venous stasis is apt to ensue. Sudden reaction must not be brought about by injudicious stimulation or tonic treatment. For if the delicate cerebral vessels be suddenly filled with blood, the nerve centres may be irritated, and headache and extreme discomfort arise. I have known the pulse run up from 50 to 84 in the course of a few hours when tonics have been attempted too soon, or the patient has brought on acute indigestion by eating a heavy meal.*

There are two means of acting on cerebral anæmia—(1) by raising the blood pressure generally, in which the brain profits; and (2) by acting on the cerebral vessels, and dilating them especially. These two measures may be combined with advantage in many cases.

Alcohol.—Headaches due to cerebral anæmia and exhaustion are frequently relieved by the moderate use of stimulants. A little champagne or claret, or weak brandy-and-water, may be taken with the meals (but not at odd times) so as to prop up the system with artificial strength. When taken in moderation it dispels the feeling of fatigue and exhaustion, and

* I would here express my obligations to Dr. J. Milner Fothergill for much information derived from reading his two instructive and valuable papers on 'Cerebral Anæmia' and 'Cerebral Hyperæmia,' in the fourth and fifth volumes of the *West Riding Lunatic Asylum Medical Reports*. In the treatment of these affections I have freely availed myself of many hints and suggestions. These papers will amply repay attentive study, from the orderly manner in which the facts are marshalled, and the physiological reasoning which supports the views set forth.

increases the tonicity of the vascular system ; but when the habit is acquired of drinking to excess it produces incalculable harm, by enfeebling the digestive power, and aggravating the headache and confusion. The gastric juice, which is poured out in additional quantity, becomes less responsive to the stimulus which invited its secretion, and in place of it, viscid mucus and fermentative products arise. The more concentrated the stimulant the more injurious are the consequences on the mucous membrane. The hot and burning sensation which is experienced on swallowing a full potation of brandy is due to the action of the alcohol on the tissues, the mucous membrane becoming white and puckered up. Dr. Lauder Brunton says that in common with hot metal, or corrosive sublimate, it coagulates albumen, and that the white colour of the mouth is "no doubt due to the precipitated albumen on the surface obscuring the red colour which the circulating blood imparts to the tissues beneath."

The influence which alcohol exerts on the mucous membrane of the stomach is precisely similar. We are so well acquainted with the gastric uneasiness which accompanies the dry hot mouth of a previous night's debauch, that a general conviction among the public has arisen that the state of the one organ is the index of the other. "When the stomach is empty, its mucous membrane, as seen through a gastric fistula, is pale, and only covered

with a little mucus. If a little alcohol is now introduced, the blood vessels of the mucous membrane dilate, and it becomes of a rosy red colour; its glands begin to secrete copiously, beads of gastric juice stand upon its surface, become larger and larger, until they can no longer preserve their form, when they coalesce, and run down together in a little stream.* The very opposite condition follows a large dose; the mucous membrane becomes pale, and the secretion of irritative mucus takes the place of the gastric juice.

Before considering the value of alcohol in cerebral anæmia, its general therapeutical action may receive a brief notice. Over-indulgence in alcohol (alcoholism) is a formidable disease of the nervous system. In its early stages it is characterized by derangement of the assimilative functions, as dyspepsia, nausea, and congestion of the liver; and, later on, by failure of nutrition, muscular weakness, diminished intellectual force, and gradual degeneration of the nerve centres and tissues of the body.

When alcohol is habitually resorted to in excess, its action resembles an overdose of opium, chloroform, or ether, and these direful consequences are due to the impregnation of the blood with a large percentage of the poisonous agent. "It may cause the corpuscles to run too closely together, and to adhere in rolls,"

* 'The Physiological Action of Alcohol,' by T. Lauder Brunton, M.D., F.R.S.—*The Practitioner*, January, 1876, p. 61.

converting their clear outline into an "irregular or star-like edge," and changing "the round corpuscle into the oval form." These changes appear to be due to the action of the spirit in extracting the water contained in the corpuscles.* "It may fix the water with the fibrin, and thus destroy the power of coagulation, or it may extract the water so determinately as to produce coagulation."†

Experimental physiology has aided us immensely in explaining the action of alcohol on the nervous system. "If we surround a living nerve (partially dissected from its connections) with alcohol of a certain strength, we find that it becomes paralyzed, *i.e.* incapable of transmitting impressions through its affected part; while a very weak mixture of alcohol and water is incapable of producing this effect. Similarly, if an animal absorb into his circulation a certain quantity of alcohol within a given time, the nerve centres and the peripheral nerves become (though in less degree) paralyzed."‡ This experiment forcibly teaches us that blood so charged with alcohol is totally unfitted to support the nervous tissue in health; "there is, however, a co-operative cause of no small importance, namely, it has been ascertained by the researches of various observers that the im-

* 'On Alcohol.' A course of six Cantor Lectures, delivered before the Society of Arts, by B. W. Richardson, M.D., F.R.S., 1875, p. 45.

† *Ibid.*, p. 46.

‡ *Reynolds' System of Medicine*, 'Alcoholism,' vol. ii. p. 144. By F. E. Anstie, M.D., F.R.C.P.

pregnation of the blood with large quantities of alcohol interferes with its absorption of oxygen,"* and lessens the oxidizing power of the red corpuscles.† A moderate amount of alcohol, by dilating the minute blood vessels, and stimulating the action of the heart, is a remedy in cerebral anæmia not to be lightly set aside, when the circulation is reduced below its normal activity; for, by improving digestion through its action upon the gastric nerves, it enables food to be digested which cannot otherwise be assimilated, whilst it furnishes in itself a certain amount of oxidizable material, and is in so far a form of food; but carried beyond a certain point, it reduces nervous control, and as doing so is an indication of evil augury. The heart beats quicker, and as it loses force in proportion, its power is too weakened and impaired for any prolonged effort or exertion. Some cases of cerebral anæmia, in which headache is the most prominent symptom, have yielded to a moderate use of stimulants, from the dilatation of the vessels and the better supply of blood. The slackened tide of the circulation has gained a new impetus and vigour, and all the functions have derived additional stimulus to ward off threatening mischief; but taken immoderately, or on emergencies, the physical danger done to the animal economy is manifested in organic deterioration, and

* *Reynolds' System of Medicine*, 'Alcoholism,' vol. ii. p. 145. By F. E. Anstie, M.D., F.R.C.P.

† 'The Physiological Action of Alcohol,' by T. Lauder Brunton, M.D., F.R.S.—*The Practitioner*, February, 1876, p. 122.

in the shrinking and alteration of the nervous texture. To these succeed muscular weariness, confusion of thought, looseness of ideas, and irresolution of purpose. Heavy dreams and restless sleep increase the headache. As the prostration of vital energy creeps on, the mind loses its grasp of recent events, as in childhood, into which it may be said to pass a second time, while failing speech is the harbinger of a general paralysis and a total wreck of all that was formerly so compact and powerful.

If in cerebral anæmia drink is too much indulged in, the sufferer wakes with a diffused headache, vertigo, and flashes of light before the eyes. He has many of the symptoms which herald the approach of intoxication; a mental disquietude takes possession of him, and he is painfully apprehensive of danger in open daylight, and exceedingly nervous about his state of health. His whole character is changed; tears are shed and dried up in a moment; his face becomes blank and expressionless, and his eyes watery and inflamed. For some years past I have had under observation a case of headache from cerebral anæmia, where the chief symptoms were kept up by the injudicious use of alcohol. The deleterious consequences chiefly showed themselves in disorder of the gastrointestinal mucous membrane, while on one occasion profuse hæmorrhage from the stomach and bowels took place. These symptoms were so severe that ulceration of the stomach was at one period suspected;

but abstinence from all stimulants, and a milk diet, rapidly improved the condition. It was followed, however by a relapse on two separate occasions, when the old habits were resumed, and nausea and bilious attacks were of common occurrence. Other symptoms supervened, indicating nerve degeneration; a tremor of the lower limbs, and unsteadiness of gait, similar to what is observed in delirium tremens.* The face was generally pale and sallow, but it would flush under ordinary conversation, and the pulse, which was habitually small and slow, would become quick and tremulous. Then ensued the most painful headache and confusion of ideas—to use the patient's own phrase, "his head went all wrong," and he only obtained relief by assuming a recumbent posture in a dark and quiet room, and sleeping for three or four hours. After this rest he would sometimes wake up comparatively well.

The amount of alcohol, weighed by the standard of what a man takes in health (when all the excreting organs are actively performing their functions), is no

* "The worst sign of impending nervous change is muscular instability, irrespective of the will; that is to say, an involuntary muscular movement whenever the will is off guard. . . . In the motor centres of the nervous organization the foreign agent is creating disturbance of function. The fact is communicated to the muscles by the nervous fibres, and the active involuntary start of the lower limbs rouses the sleeper in alarm. Ignorant of the import of these messages of danger, the habituated alcoholic continues too frequently his way, until he finds the agitated limbs unsteady, wanting in power of co-ordinated movement."—*Diseases of Modern Life*, by B. W. Richardson, M.D., F.R.S., p. 265.

criterion of his capacity to tolerate it in disease. In the latter case elimination is repressed, and his nerve centres are the special organs to bear the brunt of the evil. When the appetite is poor, and an insufficient amount of nutriment is consumed, the alcohol is rapidly absorbed from the walls of the stomach, and the liver is the first organ to undergo structural change. All remedies containing alcohol in excess lessen the excretion of urea and carbonic acid, and beer* is especially a compound which interferes with the elimination of fatty and nitrogenous matters, heaping upon the system partially oxidized products, which provoke gout and liver disorder.

Our knowledge of the action of alcohol is very imperfect, but it may be said to be absorbed into the system after its reception into the blood, escaping in very small quantities by the lungs, the skin, the kidneys, and the bowels; so that it is now a generally received opinion that a considerable quantity dis-

* One pint of beer (20 ounces) will contain—

Alcohol	...	...	...	...	1 ounce
Extractives, dextrin, sugar	...	...	...	...	1·2 ,, (524 grains)
Free acid	...	...	...	...	25 grains
Salts	...	...	...	...	13 grains.

—*Practical Hygiene*, by Dr. Parkes, 4th Edition, p. 257.

“One ounce of alcohol is equivalent to two fluid ounces of brandy (containing 50 per cent. of alcohol), or to five ounces of the strong wines (sherries, etc., 20 per cent. of alcohol), or to ten ounces of the weaker wines (claret and hocks, 10 per cent. of alcohol), or to 20 ounces of beer (5 per cent. of alcohol). If these quantities are increased one-half, 1½ ounces of absolute alcohol will be taken, and the limit of moderation for strong men is reached.”—*Ibid.*, p. 277.

appears in the body.* The experiments of the late Dr. Anstie, Thudichum, Dupré, Baudot, and others, show that the elimination of alcohol is very trifling through the kidneys. Although there is some difference of opinion as to the amount excreted, most observers are tolerably agreed that it is very small. The constant consumption of large quantities of alcohol leads to the accumulation of fat in the system, and produces degenerative diseases of a fibroid and fatty nature. "The brain and its membranes, and its vessels, suffer early and principally; and Kremiansky has produced hæmorrhagic meningitis and pathological changes in the brain vessels and membranes in dogs by giving them alcohol. There is no question that several brain diseases, including some cases of insanity, are produced by excess of alcohol. So, also, degenerative changes in the stomach, liver, lungs, and probably in the kidneys, result from immoderate use."—(Parkes.)† Out of 200 patients with Bright's

* "When only one fluid ounce of absolute alcohol was given, none could be detected in the urine. We found that in a strong healthy man, accustomed to alcohol in moderation, the quantity given in twenty-four hours that begins to produce effects which can be considered injurious is something between one fluid ounce (= 28·4 C.C.) and two fluid ounces (= 56·8 C.C.). The effects which can then be detected are slight, but evident narcosis, lessening of appetite, increased rapidity of rise in the action of the heart, greater dilatation of the small vessels as estimated by the sphygmograph, and the appearance of alcohol in the urine. These effects manifestly mark the entrance of that stage in the greater degrees of which the poisonous effects of alcohol become manifest to all."—Parkes, *Practical Hygiene*, 4th Edition, p. 277.

† *Ibid.*, p. 276.

disease, from all causes, Dr. George Johnson found no less than 58 were drunkards.* Unfortunately there are many forms of bodily weakness and mental wretchedness, which drive the sufferer to seek stimulants, not only from the gratification he feels in the indulgence, but to drown his misery in excitement and forgetfulness. Among the diseases which impel persons to drink, nervous affections and periodical losses of blood are the most frequent, and the dose which at first restores the nervous system to its healthy standard, is soon carried beyond reasonable limits. The relief furnished by alcohol in the misery of cerebral anæmia, is one of the most fertile sources of drinking habits, especially among women.

* Parkes, *Practical Hygiene*, 4th Edition, p. 276.

CHAPTER II.

THE HEADACHE OF CEREBRAL HYPERÆMIA.

General and Local Causes—Active and Passive Hyperæmia of the Brain—Condition of the Heart and Arterial System in some Cases of Surgical Pyrexia—Gouty Hyperæmia—Active Hyperæmia sometimes due to Structural Delicacy in the Walls of the Blood Vessels—Connective-Tissue Overgrowth in the Brain—Nature and Causes of Passive Hyperæmia or Congestion—Anatomical Changes in the Vessels and Meninges—Symptoms of Hyperæmia—Symptoms and Pathology of Sunstroke—Effect of Blood-letting and Cold in reducing the Temperature of Hyperpyrexia—Hyperæmia due to Intellectual Strain and Bodily Exertion—Relation of the Tissues to their Blood Supply, and the Effect of an increased Blood Supply upon the Growth of a Part.

Treatment—Occasional Utility of Venesection—Value of Aconite, Tartar Emetic, and Saline Purgatives—Friedrichshalle and Hunyadi Janos Waters—Moderation in Diet and Avoidance of Stimulants—Importance of Walking Exercise—Effect of Bromide of Potassium, Opium, and Hydrate of Chloral in diminishing Cerebral Excitement and relieving Headache—Action of these Sedatives on the Nerve Cells—Ergot of Rye—Therapeutic Effects of Cold, and its Mode of Action—Utility of the Ice Cap in controlling Cerebral Hyperæmia and Vascular Excitement.

WHEN an increased quantity of arterial blood passes through the encephalic mass, it constitutes the condition known as cerebral hyperæmia. It is obvious

that the veins at the same time are full and distended, and hence a state of venous congestion is established leading to engorgement and retardation of the blood current.

It will be pointed out in another chapter that there are no more common causes of congestive or hyperæmic headache, than over-prolonged thought, and too great mental occupation. When the mind is attentively engaged on any special line of abstruse reasoning, or taken up with care and anxiety about worldly affairs, the effect of this concentrated attention is to dilate the arterial vessels, and to admit a larger quantity of blood than usual to the cerebral cells, by which they are overwhelmed. "The activity of an organ is in strict relation to its blood supply, and the capacity of each brain from time to time, not as compared with other brains, depends upon the amount of arterial blood passing into it. Such is the true physiological cerebral hyperæmia of brain activity, contrasted with the anæmia which is an essential factor of sleep. As sleep comes on, the brain falls, becomes paler, and many of its blood vessels that could be recognized during the waking state become undistinguishable. When consciousness returns in the act of awaking, the process is reversed ; the brain fills, grows ruddier, and the vessels which were lost sight of in sleep can again be distinguished by their enlarged calibre. Such is the difference betwixt the conditions of sleeping and waking—so

far as the blood supply goes, but no further." * As the brains of most persons are kept in a state of great activity at the present day, it is probable that the vessels are habitually full, and the tissue is increased in vascularity. This is proved to be essential for the maintenance of their healthy functions, and these might even be arrested if the supply of arterial blood was deficient.

Cerebral Hyperæmia as a morbid state is a frequent cause of headache ; especially of that variety in which the nervous substance and the blood vessels are both concerned. The brain is increased in volume, and presents a turgid appearance when it is superficially examined. The small red points which are observed when the brain is sliced are the mouths of open blood vessels, and in some hyperæmic states of the brain they exude a good deal of dark blood, as where death has resulted from bronchitis and whooping-cough, or from fever, and organic disease of the heart and kidneys, which have induced coma and stagnation in the contents of the venous vessels. A faint reddish or pinkish tint of the cerebral substance is not uncommon in the case of children who die of convulsions or meningitis, and this is attributable more frequently to the same pathological change than to actual inflammation and the products that arise from it. This condition is, I believe, a common

* Dr. J. Milner Fothergill on 'Cerebral Hyperæmia.'—*West Riding Lunatic Asylum Reports*, 1875, vol. v. p. 172.

exciting cause of headache. It leads to local congestion (partial hyperæmia), which often indicates the seat of suffering. When a change of this character is present in a well-marked degree, and has come on rapidly, death may take place from severe congestion without the occurrence of actual hæmorrhage, or destruction of brain substance. In these cases the ventricles are found much distended with serous fluid, and the parts at the base of the brain are soft and succulent.

There is an active and a passive hyperæmia of the brain—two opposite conditions due to separate causes, and presenting a distinct set of symptoms. In the active form the arteries contain a larger quantity of blood than usual. Active hyperæmia of the brain occurs with violent action of the heart, or excitement of the circulation, from fever and so forth, as we have already seen. If the nerves are healthy, they may undergo some degree of pressure from distended vessels without causing pain or disturbance; but if they are over-sensitive, any change in the force of the circulation at once distresses them; and hence it happens that an excited action of the heart from running, palpitation, or violent coughing in pulmonary disease, aggravates the nervous suffering if long continued. But this by no means can be accepted as a rule, for the exertion of wrestling, running, and active gymnastic sports, which subject the cerebral vessels to extreme pressure from the accumulation

of blood within them, does not cause pain and suffering; and we can only infer that this exemption arises from a healthy condition of the nerves, unless the fulness and congestion have been of such duration that a change has taken place in them. I am glad to be supported in this view by so able an authority as that of Dr. Handfield Jones, who observes that the effects produced by cerebral hyperæmia vary according to the condition of the nervous centres, and that when the organ is healthy, a moderate hyperæmia does not disorder their action, but that in weak and excitable subjects the excitement may be very great.*

Here we must not lose sight of the consideration, that the internal carotid artery, by its tortuous course through the petrous bone, provides against sudden rushes of blood to the brain in violent exertions, and so forth. We probably do not yet quite understand the delicate and intricate *vaso-motor* mechanisms which govern the changes of calibre of the smaller vessels of important organs, and regulate the supply of blood to their ultimate cellular elements. That this must be very perfect in health, we must allow; that it may be thrown out of gear by various disturbing factors, we can understand; and so we cannot doubt that many cerebral disorders, such as localized and transient headaches, which lead to marked

* *On Functional Nervous Disorders*: 'Hyperæmia of the Brain,' 1870, p. 88.

pathological changes in the event of opportunity for inspection, must be due to processes at present beyond our ken. We recognize them clinically, and, from the results of treatment, we believe that we interpret aright their pathological origins; but we must advance with caution, and not be led away to statements of positivism, concerning changes in parts, whose normal performances in the routine of the vital processes is not yet fully explained and proved.

When febrile symptoms follow surgical operations, we may sometimes witness high temperature, and intense excitement of the arterial system. There is tension in the pulse, a tumultuous and rolling action of the heart, and an exaggeration or modification of its sounds, followed in some fatal cases by the deposition of fibrin in one or more of its chambers. An indescribable weight and confusion in the brain, with headache and dizziness, are experienced, which are more rapidly relieved by cold to the head than by any other measure with which I am acquainted; except in some cases where venesection is so far to be credited with reducing the temperature, that it has been known to refuse to fall till blood-letting was practised. I shall consider this more fully when we come to speak of the treatment.

This form of hyperæmia is witnessed to perfection in the high inflammatory fever which sometimes succeeds great surgical operations, more particularly in

young full-blooded persons, who are not emaciated or otherwise reduced by the disease ; or who have not lost sufficient blood at the time of operation to control excessive reaction. At the commencement of these cases the skin is dry and pungent, the pulse is generally hard, tense, and rapid ; the conjunctivæ are reddened, the carotid arteries beat violently, and the jugular veins are likewise full and pulsating ; the heart's action is tumultuous, and strikes vehemently against the walls of the thorax ; the sounds are muffled and run together, or the first sound is soft and prolonged, both at apex and base. This is just what might be expected from the alteration in the relative proportions of the blood corpuscles, and the rapidity with which the organ has to deal with the obstruction offered by the deposition of fibrinous coagula in one or more of its chambers. With this state of vascular excitement there are disturbances of sensibility, which partake more of an irritating than of a painful character. There is throbbing over the forehead and vertex of the head, and a feeling sometimes of contraction, and at others of bursting—I have heard it also described as a disagreeable or nasty sensation ; the sight is dim, and the patient prefers darkness to daylight ; sleep is broken and disturbed by restless dreams, till the head is cooler and the temperature reduced. The constitutional symptoms are not so alarming when the skin is bathed in sweat and the kidneys are acting

freely, for then the tension is to a great extent taken off the arterial system, and the determination of blood to the brain is lessened. The pulse is more compressible, the confusion of ideas is mitigated, but the face may assume a purplish flush, and the lips become of a dark livid red. In cases of this character the injudicious use of stimulants, even in the shape of hot tea or coffee, aggravates the symptoms of cerebral excitement, and increases the engorgement of the vessels, till they are on the point of rupture, or so distended that they cannot propel their contents; and at last induces serous effusion in the neighbourhood of the large vessels at the base of the brain, with a torpid and comatose condition.

Some persons of a sanguine and excitable temperament suffer from active hyperæmia, or determination of blood to the head. They experience sound health till something ruffles them, or opposes their plans, and then hyperæmia is readily induced by alcoholic stimulants and high feeding. It cannot be said that there is too large a quantity of blood in the body; on the contrary, the predominance of the nervous over the vascular element renders it probable that there is habitually an insufficient supply for the demands of an over-strained nervous system. The brain in these cases is exposed suddenly to a sort of deluge; and two factors are concerned in the mischief. A disturbed stomach transmits its irritation through the sympathetic system to the brain, already

overloaded with blood ; and as the vaso-motor nerves become relaxed, a further increase of blood overpowers the brain in consequence, apart from the hyperæmia which the increased activity of the systemic circulation induces. Persons whose digestive organs are weak and sensitive, or who sit down to a meal agitated and disturbed, soon experience discomfort and excitement ; the head aches violently, the face flushes scarlet, and no ease can be obtained ; the temporal arteries throb, and the pulse is full and frequent. Everything that is taken causes nausea or vomiting, and no relief is forthcoming till a few leeches are applied to the head, or the contents of the intestine are washed out by active purgation. Instances of this kind occasionally present themselves in the practice of our profession. When the headache continues severe, and the intelligence becomes blunted, so that the patient can scarcely stand or walk, a moderate blood-letting, or a free epistaxis, has been followed by immediate relief, and the cerebral congestion had disappeared. If no revulsive measures have been resorted to, or the loss of blood has not occurred, the symptoms of active congestion and intravascular pressure may be converted into those of effusion and fatal apoplexy.

Active hyperæmia is very commonly seen among men who have passed the meridian of life. They are of stout configuration, and the face is full and florid ; the conjunctivæ are injected, and the pulse is firm

and incompressible. They easily tire and become breathless on exertion if they attempt to walk at a moderate pace, or ascend a hill, which is one reason why sedentary pursuits or actual idleness are more congenial to them than outdoor occupation. Such men as these need be endowed with immense energy and force of character to willingly encounter fatigue or determine to live abstemiously. The ordinary precautions against illness are disregarded and set aside, and the patient never pauses to consider that his mode of living is injurious, but goes on in the same course. His mental condition is eminently characteristic. However amiable he may be by nature, irritability becomes a new and striking feature in his character, surprising his most intimate associates, and those who have known him best through life. Trifling annoyances vex him and put him out, and he bursts into fits of passion and violence, which would not disturb the mind of a man in health. As soon as these outbursts of passion are over, the mind is restored to reason and reflection; and, as he finds relief, so he admits the weakness that overtook him. He is what is called "low" at times, and suffers acutely from throbbing headache. These persons have lived too well from their early manhood, and indulged in food of a nitrogenous character. In consequence of this stimulating diet, and the patient's lethargy and inaction, effete matters accumulate in the blood, and throw upon the kidneys and other

excretory organs an amount of labour which provokes structural change. A gouty element is the disturbing foe when more visible indications are wanting; and one of the first morbid changes to arise is a hyperæmic state of the kidney from the excessive supply of blood, so that the organ is no longer able to completely discharge its functions. Then follow spasm and thickening of the arterioles, and that rise in blood pressure which leads to hypertrophy of the left ventricle, and the transmission of blood to the brain in greater force. As therefore the heart increases in size from the additional duty it is called upon to discharge, so the natural tissues of the kidney become diseased, and the vessels of the brain atheromatous and liable to rupture from the distension to which they are subject.

The condition of cerebral hyperæmia is denoted in some persons (especially men of full or gouty habit who are approaching sixty years of age), the face being florid, and the capillaries full and distended. Not unfrequently the nose is marked with acne rosacea, from the too free use of stimulants and over-indulgence. Subconjunctival hæmorrhages are not uncommon, and warn us of the possibilities of like lesions in the brain. There are noises in the ears, and the head is confused and aches fearfully—it is a deep-seated pain, as though a nail was being driven into the head; and the pulse is full, tense, and hard, or often felt to be rigid from atheromatous degeneration.

Structural change may begin in the kidneys, and this, causing a rise in blood pressure, propels the blood with greater force through the encephalic arteries ; thus is brought about an overloaded state of the cerebral arteries, and an increase in the growth of the tissues which enter into their structure. The heart's sounds afford evidence of the mischief which the arterial tension discloses ; the impulse is frequently increased, and the area of præcordial dulness also ; whilst the aortic second sound is accentuated. In a case which has furnished these remarks, the patient was sixty-five years of age, and there stole on gradually a forgetfulness of passing events, and an indistinct utterance, which finally ended in the rupture of some vessel near the base of the brain.

There is another form of active hyperæmia due to structural delicacy in the walls of the blood vessels, and their feeble resistance. In consequence of their thinness, they yield to the pressure of the blood current when the heart's action is increased, and too much pressure is put upon them ; the capillaries become injected and bright, and the patient feels the rush of blood to the head. These patients have most likely dilated vessels also, through imperfect performance of the function of the vaso-motor nerves, and consequently they all the more readily yield to an increased pressure of blood. Some persons suffer from this congestion, after running or engaging in active exertion ; and it is followed by symptoms

of sickness and severe headache. It is observed in many acute pulmonary diseases, and is the chief cause of fatal exhaustion in these cases. If a meal has been recently taken by a person whose nervous system is agitated and depressed, or if he exposes himself to the sun or to noise and confusion after it, the mental excitement disturbs the process of digestion, and provokes a hyperæmic state of the cerebral vessels. It is not uncommon as a consequence of aortic insufficiency, the result of endocardial inflammation. In these cases the carotids are too full of blood, and their tension and impulse are strikingly apparent. The undue pressure to which the left ventricle has been exposed has led to dilatation and hypertrophy of its structure, from the augmented effort it is called upon to make, and it sends onward an increased volume of blood through the diseased and altered orifice. Now, what are the ultimate consequences of mitral valvular derangement on the cerebral circulation? Every time the ventricle contracts, a smaller quantity of blood is discharged, and some portions during the systole flow back again, further crippling the auriculo-ventricular valve, and disabling or half paralyzing the left auricle. This induces engorgement of the pulmonary veins, and, indeed, of the whole venous system, so that headache, dizziness, and delirium are common, and death from congestion becomes intelligible. In aortic stenosis, the arteries are scantily filled, and there are no signs

of venous engorgement ; pallor of the face, syncope, and anæmia of the brain are the characteristic symptoms, just as hyperæmia of the cerebral circulation is associated with valvular insufficiency.

Again, any condition which arrests or interferes with the cutaneous circulation will cause active hyperæmia, as severe exposure to cold, or the cold stage of intermittent fever.

In the brain, as in other organs, when it has long been subject to hyperæmia, there is developed a certain amount of pathological connective-tissue, which gradually contracts. In the liver and kidney this pathological process is accompanied by reduction in the bulk of the organ. The brain being in an unyielding bony case, its contraction is accompanied by the effusion of fluid. This is a condition known as the water-logged brain, common in some forms of insanity. Niemeyer has given it the name of Hydrocephalus ex vacuo.*

Connective-tissue overgrowth in the brain, as a consequence of alcoholic indulgence, has been pointed out by Schroeder Van der Kolk, and physiological investigation would seem to establish the fact that the absorption of alcohol into the cerebral tissue causes the nerve cells to undergo important physical changes, producing degeneration and disease.†

* Niemeyer, *Practical Medicine*, vol. ii. p. 247.

† 'Effect of Alcohol on the Brain.'—*Lancet*, September 30, 1876, p. 470.

Passive hyperæmia or congestion arises from any pressure on the jugular veins interfering with the free return of blood to the heart. We have examples of it in cases of glandular enlargement of the neck, as in bronchocele, aneurisms of the aorta, and hypertrophy of the thyroid; in tricuspid insufficiency; in the violent expiratory efforts produced by straining and coughing, as in whooping-cough, when the blood accumulates in the general circulation rather than in the pulmonary. The brain is overloaded, and maintained in this unhealthy condition because the obstacle cannot be overcome. This does not apply to the circulation through the lower organs of the body, where it is much less impeded. In all diseases of the heart, particularly when the right ventricle is diseased and acts imperfectly, the over-fulness of the veins leads to capillary engorgement, because the blood is obstructed in them; and this is a common cause of cerebral hyperæmia. In valvular disease of the right heart this affection is far greater than when it occurs on the left side, because the return of the blood is enormously impeded.* In cases of chronic bronchitis with a weak and dilated right heart, this state is also of common occurrence. In pleuritic effusion and compression of the thoracic viscera, in emphysema and chronic diseases of the lungs, there is congestion of the brain from the overloading of the systemic cir-

* See Chapter IV., on Congestive Headache, where this subject is continued.

ulation, when the right heart does not act proportionately strongly enough to overcome the impediment.

But I must not omit another important phase of the gouty diathesis, which I shall briefly allude to here, as it is rather of a passive than of an active character. Headache is the prevailing symptom of this condition, frontal and deep-seated, and so continuous that the nerve structure is gradually brought to the verge of disease. It may continue for years, and end in apoplexy or rupture at last. The well-to-do rector, or the country squire who has seen sixty summers, is the victim of this condition; they are prone to gouty bronchitis on any change of weather, and there is vesical irritability with an abundance of lithic acid in the urine, and very commonly enlargement of the prostate gland. The digestive functions are constantly getting wrong, and there is a foul tongue, with much flatulence and discomfort after food; the bowels are habitually costive, and need aperients to maintain their regular action. The patient cannot exert himself to his accustomed duty, and is too nervous to seek society. He has confused sensations in the head, and noises in the ears: he moves along slowly and carefully, rather than walks, but with a faltering step withal; and, if spoken to, or stopped on his way, turns round so guardedly that his head seems to have no independent motion from the rest of the body. The heart indicates commencing degenerative change, and the aortic valves early

become the seat of morbid changes. Nearly all his disagreeable sensations are referred to the head ; and, when not actually painful, it is too disordered to admit of any exertion. When there is no need for worldly anxiety, he conjures up ideas of impending ruin, and is hysterical or so nervous, that life is irksome to himself, and his presence unendurable to others. The blood is here also contaminated with nitrogenous waste, and the cerebral vessels are habitually overloaded from this poisonous source of irritation, to the risk of threatening rupture. The patient's general demeanour is altered, and dejection of spirits and moroseness of manner are rather the mental traits than excitement and irritability. Still, there is general restlessness and a desire to be doing. The terrific headache and the morbid sensations to which these persons are liable depend on excitement of the cerebral cells, scarcely to be accounted for by any additional supply of arterial blood, but more to venous fulness and stagnation. The relation which this cell activity holds to the blood supply, and their dependence on one another, have yet to be determined. With this headache and increased local vascularity there is not necessarily associated a general arterial excitement, for the pulse may be slow and regular, and the face pallid. These latter cases are often the consequence of mental anxiety or over-strain, and the evidences of exhaustion and low blood pressure are to be observed.

When we reflect on the anatomical changes in the vessels and meninges of the brain, it is no easy question to decide on the appearances they may be expected to present after death; and it must be remembered that the pathological changes observed may be very imperfect aids to inform the mind of an inquirer as to the morbid processes that were going on during life. We often find in the case of children, after death from head affections, the brain is only moderately congested, and yet the symptoms have been alarming, and death rapid with insensibility and coma. Again, the best examples of congestion and hyperæmia may fail to account for the symptoms during life. But when the continuance of active cerebral hyperæmia has induced pain in the head, disturbance of the mind, and a severe degree of cerebral congestion, it may result in delirium and meningitis. This is by no means of rare occurrence in malarious fevers, which are so common in tropical climates. After death in such cases, the minutest vessels of the brain have been found injected, and the arachnoid thickened and of a deep red colour. Extravasation of blood beneath the scalp and between the dura mater and the skull is found in some cases of this sort. The internal organs, also, as the liver, stomach, and spleen, undergo enlargement and softening as the result of inflammatory action.

Symptoms of Hyperæmia.—Although I have dwelt at some length on the causes of congestion and hyper-

æmia of the brain, it would be a deeply rooted error to infer that disturbance in its functions necessarily originates in either state, if actual change of structure be excluded. The brain disturbance in fever arises from the high temperature and a change in the quality of the blood, which is at variance with a healthy condition of the nerve substance; hence delirium and a comatose state in low fevers affecting the brain are not infrequent, where the heart's action is feeble and the blood supply is also deficient.

In cases of severe sunstroke, where the patient is struck down suddenly, the symptoms are rather due to a paralysis of the functions of the brain than to a state of hyperæmia. The nerve centres are overheated and depressed, and, until the temperature is lowered, they cannot recover their action. These facts point out the rational treatment of the disease. "As the hyperpyrexia is due, not only to the direct operation of heat on the nerve centres and tissues, but also to the fever set up by the disordered vaso-motor arrangements, remedies, such as may influence this disturbed condition, have been suggested. The results have appeared in some cases to justify the theory; and the hypodermic injections of morphia and of quinine have both been considered to produce good results by their influence on the vaso-motor nerves, and their power in retarding tissue change." * The

* 'On Sunstroke.'—*British Medical Journal*, August 12, 1876, p. 224. By Sir Joseph Fayrer, K.C.S.I.

plan of treating sunstroke by the subcutaneous injection of quinine, first introduced by Surgeon-Major A. R. Hall, has been found most successful. It is especially serviceable for troops on the march where ice is unattainable (Form. 115). There is excitement and cerebral irritation in some cases, but in the majority of cases the patient falls down and gasps for breath, as in syncope. The production of heat is increased by muscular exertion, and the body becomes overheated, because perspiration takes place slowly through the high temperature of the atmosphere; and hence the overloading of the vessels of the brain and the other organs of the body, but more particularly congestion of the lungs, and distension of the right heart. Post-mortem examination verifies this in fatal cases of sunstroke, where the blood is fluid, as in death from lightning, and blows on the epigastrium. In mild cases of sunstroke prolonged headache (which is not an early symptom), irritability, exhaustion, incapacity for mental exertion and the concentration of ideas, are induced. For it is important to remember that the shock of the seizure and the high temperature together, are highly injurious to the nerve centres, overloading the brain with blood, and sometimes inducing severe meningitis. A brain habitually charged with too much blood is just as likely to lay the foundation of gradual tissue-change, as is the direct operation of heat and exposure to the sun. In the management of these

cases of hyperpyrexia and headaches Sir Joseph Fayrer insists on reducing the temperature as quickly as possible by the use of the cold douche to the head and body, mustard poultices, and purgative enemata. He relies little on blood-letting, and records that of numbers of soldiers who were struck down in the Burmese war in 1852 by the direct action of the sun, all recovered except two, who were bled on the spot where they fell. These remarks are in accordance with those of Dr. Wilson Fox,* who says that cold is the only means of reducing the temperature in hyperpyrexia. He shows that venesection, in one case to twenty ounces, had no effect in checking the rise of temperature in acute rheumatism; whilst he cites two cases of recovery under his own care, where the temperature in one case reached 110° , and in the other 107.3° . He considers that venesection prejudicially interfered with the cold applications, and was the cause of death in one case through the exhaustion induced.

In simple congestion the escape of venous blood is arrested, and the blood passes slowly through the capillaries from this overfilling. Both in anæmia and congestive venous hyperæmia, the brain is not supplied with its due amount of arterial blood, and so the cerebral symptoms are allied; and the general condition bears a close resemblance in the two cases.

* 'On Hyperpyrexia,' 1871, pp. 1 and 43. These views are supported in H. C. Wood's work on *Thermic Fever*.

The pain and irritation induced by active hyperæmia are not precisely alike in all instances. At one time the functions of sensation are more affected than those of motion, and at another time the mental faculties are marked out for special implication. The thoughts are rapid, loose, and unconnected, and the ideas are confused and false. Life is looked at through a false medium. When the sensory functions are involved, there are headache, excitability, and extreme sensitiveness to every impression that goes on around, the slightest sound worrying the patient, and even quiet conversation being distasteful. The light of the sun causes a disagreeable and oppressive feeling to the brain, scintillations of light appear before the eyes, and there are noises in the ears. Some persons experience a condition of hyperæsthesia periodically ; it comes on suddenly, and lasts a day or two, then goes away as it came.

There is a form of hyperæmia of the brain in men who tax their intellectual efforts to the highest point, and who at the same time exert their bodily strength by other duties and calls on their attention. They scarcely allow themselves time for their meals, or take them irregularly or hurriedly, and perhaps indulge in stimulants to keep them up to the right mark. There is headache with disturbed sleep, and pain at the back of the head, or a feeling of blood rushing into the brain ; sometimes there is delirium. These persons are nervous and apprehensive, yet they cannot stop

the speed at which they are pushed along the stream. Sometimes the pulse is quick, and there is fever ; or it is slow and laboured, not more than sixty beats a minute, and then the patient is depressed and more or less indifferent about himself. The urine is very changeable ; at one time it is high coloured and intensely acid, or it is as pale as water, and contains phosphates in abundance. There may be redness of the face, but often there is pallor and a worn, exhausted look ; the patient loses flesh and strength, and the excitement gives place to lethargy and depression. If he indulges too freely in stimulants, melancholy and even mania may result, or apoplexy and paralysis may be the termination. Suddenly the patient feels bewildered and giddy ; he staggers or even falls, or he rushes and takes wine or brandy to support his failing circulation. His head is hot ; he cannot engage in conversation, and is glad to resign himself to rest and a recumbent posture. After a few hours' rest or sleep, when the venous blood is better circulated, and the supply of a proper amount of arterial blood stimulates the brain and nervous centres to healthy excitability, the patient recovers and goes on again ; or if the condition continues to recur from time to time, the nervous substance is structurally altered, and loss of consciousness or convulsions are produced.

It is quite in accordance with clinical experience to have partial hyperæmia of the brain, where certain

spots are more congested than others. This may be due to tumours, or to partial softening, and localised extravasation. An artery may be compressed, and other vessels become engorged, so that some portions of the brain are anæmic and others hyperæmic; this is what we sometimes see in other organs of the body. Unless there are local symptoms, the cause cannot be found out. There are headaches limited and circumscribed—contraction of one or both pupils, noises in the ears, imperfect vision in one eye, neuralgia of one eye, but never loss of sensibility in one spot, or paralysis of one side. The treatment consists in relieving the local congestion.*

In discussing the question of hyperæmia of organs there are two factors to be included, the omission of either of which would greatly invalidate any conclusion that might be drawn. The first is the relation of the tissues to their blood supply. This is seen in the increased blood flow to an irritated part, as a bat's wing, for instance. The other is the effect of an increased blood supply upon the growth of a part. This is seen in the elongated limbs of chronic joint mischief, and still more vividly in the growth of the cock's spurs, which John Hunter engrafted on the bird's comb; or as happens in the

* "Local hyperæmia, in fact, is not exactly local plethora; it simply implies that too much blood is accumulated in the vessels of a part without taking any account of the nature of this blood."—*Jones & Sieveking's Pathological Anatomy*, by Payne, p. 44.

excessive growth of muscle and bone in a limb, from obstruction to the lymphatic circulation. Thus we find that there may be much vascular hyperæmia in a maniacal patient, with but little general disturbance of the circulation, or temperature. Here the cerebral cells attract blood to themselves in too great a quantity. In other cases of congestive headache, as in plethoric persons, there is a hypertrophied heart, with throbbing distended carotid arteries, and an excessive blood supply to the brain, which excites the cerebral cells and causes exaltation of the special senses, producing the appearance of flashes of light, the sound of ringing bells, and other ideal sensations. At times these conditions are blended, as in the vivid sketch of "Preparing for the House" in the Diary of a Late Physician, where the stout country squire, with a rubicund face, is in a condition of great excitement at the prospect of delivering a speech which would defeat his assailants, and forthwith establish his reputation as a politician.

Treatment.—The first indications that call for fulfilment are to lower the vascular system, and to reduce the cerebral fulness. It is obvious, however, that a separate line of treatment will be required to meet the special peculiarities of each case. If the vascular element predominates, and other measures fail to control the more urgent symptoms, venesection may be demanded to save the patient's life, and there can be no doubt that a full and effective blood-letting has

proved of great service. If the carotids beat violently and fill the brain with blood, then leeching or cupping ought to be had recourse to, as becomes advisable in some acute forms of febrile headache in young subjects. In cases of active cerebral hyperæmia, where the pulse is firm and good, aconite, tartar emetic, and other depressants are to be selected (Form. 106). Colchicum, in combination with the alkalies and iodide of potassium, will also be of service (Form. 31-34), if it appears certain that the cerebral vessels are distended, and the blood pressure is too great. The bowels should be freely evacuated by saline purgatives (Form. 19) in the early morning. An occasional pill, containing mercury, with or without podophyllin, will rouse the liver and intestines, and so bring great relief to the head symptoms, by tending to subdue vascular excitement and depress the circulation generally (Form. 81-94). If the urine is scanty and acid, and affords proof of lithiasis, which is not uncommon, it will be advisable to take plenty of diluents, and the salts of potash and lithia freely diluted with water. Friedrichshalle, Pullna, and Hunyadi Janos waters on first rising in the morning act quickly on the bowels, and produce no unpleasant effects afterwards ; and the same may be said of the aërated waters of Vichy and Carlsbad, which are favourite remedies with some persons of full and torpid habit.

In place of a heavy nitrogenous diet, fish, white

meats, and fruits are to be preferred, and fermented liquors and wines should be forbidden.

If the patient is broken down from hard mental work, or is advancing in years, venesection or cupping will be of questionable service ; for the veins of the brain and sinuses are too full and congested to be relieved by the attempt, and the shock from the loss of arterial blood could not be borne. When, too, the circulation is quiet, such remedies would be productive of harm rather than good, and we must trust to a darkened room, general quiet, and remedies of the sedative class, as hydrate of chloral.

In women the occurrence of the menses often brings relief, if the patient is abstemious in diet and avoids stimulating food. In those forms of congestive hyperæmia from pressure on the jugular veins, leeches may be used to favour the escape of venous blood. When hyperæmia results from over-feeding and stimulants, lessening the diet, moderation in living, and walking exercise will be necessary ; but no two cases are alike, and some modification will be required.

In treatment it is of the highest importance to discriminate the two factors previously mentioned ; the first is the relation of the tissues to their blood supply, and the second is the effect of an increased blood supply upon the functions and growth of a part. The proportion of each factor in every individual case must be carefully weighed, for in one the

circulation needs depressing, and in the other sedatives and rest are the chief indications. In one the line of treatment is to reduce the excessive blood supply, which keeps up too much excitement in the brain ; in the other the excited brain cells are attracting blood too freely, and the course to be adopted is to lessen their activity and their demand for blood. For this condition bromide of potassium, hydrate of chloral, and opium are the chief remedies to rely upon.

With regard to the action of sedative remedies in hyperæmia of the brain, bromide of potassium is one of the most remedial and curative agents we possess in the treatment of nervous disorders. It has been clearly shown by scientific observers that it is a most efficacious remedy in hyperæmic forms of headache, and also in those varieties of nervous headache where the cerebral cells are excited, and the emotional framework is highly strung. As bromide of potassium controls sexual excitement, it may be expected to subdue cerebral excitement also, and dissipate those conflicting thoughts and passions which stir us to anger, and aggravate the trifling incidents of daily life. Our chief experience has been derived from its efficacy in the treatment of epilepsy. As a calmative and narcotic, and as a remedy controlling vascular excitement, it is usually admitted to occupy the first rank. By reducing the irritability and lessening the fits, it controls the congestion on which the headache depends. Clouston ('Fothergillian Prize Essay') found

half-drachm doses of the bromide of potassium, of tincture of cannabis indica, and of tincture of hyoscyamus very useful in the sleeplessness of talkative mania (Form. 63). I have often given the bromide and the cannabis indica together with great advantage in smaller doses (Form. 64),* and I have known full doses of henbane with camphor, either in the shape of pill or mixture, prove an excellent and reliable sedative (Form. 65-93). In the persistent headache which follows sunstroke, bromide of potassium is the most serviceable remedy.†

Hydrate of chloral is sometimes given with advantage, either alone or in combination with the bromide (Form. 66, 67). When chloral is given alone, it acts by depressing the heart's action and lessening blood pressure, on which the cerebral excitement depends. Men advanced in life, who have still active duties to perform which require mental exertion, find their headaches relieved by a full dose of chloral on retiring to bed. This indicates the hyperæmia of vaso-motor paresis. The sleep is sometimes broken and disturbed in these subjects, and there is throbbing and a disagreeable sensation about the temples; but the next night, and for many succeeding nights, the sleep is calm and peaceful, and the patient goes about his work with renewed pleasure. This very

* *Vide* the action of cannabis indica in Chapter VI., on Nervous Headache.

† Dr. Morehead, 'On Sunstroke.'—*A System of Medicine*, edited by J. Russell Reynolds, M.D., F.R.S., vol. ii. p. 142.

action makes the drug a seductive one, and it should never be taken except under medical supervision. It probably has a greater effect upon the vascular system than the bromide, which would seem chiefly to have its action confined to the nerve centres. Bromide of potassium with digitalis is serviceable, if the pulse is fast and feeble, and the patient has a weak heart, or has overdone himself in any way.

Ergot is a remedy highly spoken of by some authorities, but I have not often employed it with so many more remedies at hand. "I have found it almost uniformly efficacious in reducing excitement, in shortening attacks, in widening the intervals between them, occasionally in altogether preventing the recurrence, and in averting that perilous exhaustion by which excitement is so often succeeded." Drs. Bucknill and Tuke add, "Dr. Browne explains its beneficial action by its influence in contracting the vessels of the brain, and administers the liquid extract of ergot in doses of from \mathfrak{zss} to \mathfrak{zj} three times a day, or \mathfrak{zj} to \mathfrak{zii} of the pharmacopœial tincture."* I do not like these large doses, for the reasons given in another place.†

One of the most powerful agents we possess in the treatment of hyperæmic conditions is cold. Cold applied to the head is admitted to act in one of three ways :—

* *Psychological Medicine*, 1874, p. 745.

† See Chapter XIV., on Headaches of Advanced Life.

1. By exerting a direct action on the superficial vessels of the scalp, and the part within the cranium.
2. By diminishing the blood supply, and contracting the vessels.
3. By exerting a sedative action on the nervous centres.

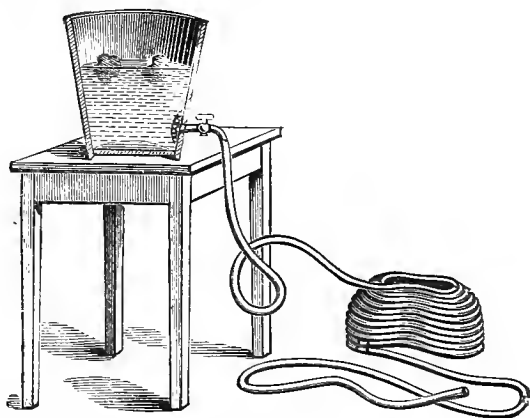
Some estimate of its power on the capillary circulation may be imagined from the effect of immersion in a cold bath for a few minutes, where the temperature, as in hyperpyrexia, may be reduced several degrees in an incredibly short space of time. M. Marey has shown by a sphygmographic tracing, that after exposure to a cold bath of one minute, there is considerable tension and hardness in the pulse in consequence of contraction in the cutaneous capillaries, and an obstacle to the passage of blood from the arteries. The effects of a hot air bath, as we all know, is to relax the arterial system, and to produce dilated vessels and general enlargement of the capillary circulation. The pulse is soft and full, and the increased frequency with which the heart acts diminishes its force and power, enabling the blood to pass freely into the veins.

When cold is applied to the head, one mode of action is considered to be by abstracting heat from the scalp. There may not be a general agreement on the subject, but it seems borne out by practical conclusions. Cold is so powerful an agent that long

exposure to it has resulted in the death of the part to which it is applied ; and congestion of the internal organs, as the brain and lungs, has been found after death, preceded by a tendency to sleep and apoplectic coma. Here it is highly probable that a brief application of cold may assist in the removal of the venous stasis, which a more prolonged application tends to induce ; and there is nothing adverse to the physiological conclusion that cold, by contracting the vessels, may, by a sedative action on the nerve centres, diminish the flow of blood generally ; and it would appear to have this effect, as it will lower the pulse, and in controlling the action of the heart, lessen the arterial supply to the brain. From a series of carefully conducted experiments performed by Dr. Benham on the dead subject, he ascertained "that as long as a fluid of a certain temperature is passing through the vessels of the intra-cranial tissues, the application of even the most intense cold to the outside of the scalp has no effect in lowering their temperature." * Now, this is what might be expected when we consider the deep tissues through which cold has to act. It may be capable of abstracting a certain amount of heat from the scalp and superficial tissues, but can it exert any physiological effect on the tissues within the rigid osseous skull ? It seems unlikely that it can do so without causing congestion, or

* 'On the Therapeutic Value of Cold to the Head.'—*West Riding Lunatic Asylum Medical Reports*, vol. iv. p. 157.

even inflammation ; yet, moderately applied, it may, through the influence of the nervous system, control the temperature to some extent. Even in experiments performed on living dogs under the influence of chloroform, although the temperature was temporarily lowered 2° , it did not continue to fall, but soon rose to the normal standard. This, therefore, was rather due to some effects on the vessels through the nervous system and sensory nerves, than to any effect on the blood temperature.



At the Samaritan Hospital an ice cap for the head is used as the easiest and best means of reducing the high temperature and pyrexia which sometimes succeed ovariectomy. The apparatus is not expensive, and is easy of application.* It consists of india-

* Improved Ice-water Cap for applying Cold to the Head in Hyperpyrexia. By J. Knowsley Thornton, M.B., M.C.—*Medical Times and Gazette*, May 27, 1876.

rubber tubing about the thickness of the little finger. This is coiled round so as to form a closely fitting cap for the head, communicating on one side, by means of the tubing, with a pail of iced water elevated about two feet, and placed on one side of the patient's bed, and communicating on the other side with a pail to receive the water which has passed through the cap. The two pieces of tubing, in fact—the one conveying water to the cap, and the other allowing its escape from it—are the two strings of a cap, so to speak.

The benefit of the ice cap seems to me incalculable in cases of great vascular fulness, for like cold affusion it exerts a sedative effect upon the heart, and rather encourages the free action of the skin, which is one of the chief means of lessening arterial tension.

In country districts, where this is not obtainable, I know of no better method of applying cold than by the constant use of strips of rags or lint dipped in water, as cold as may be found possible. These strips of lint are frequently changed as they become warm ; and considerable benefit, comparatively speaking, may be looked for from their employment.*

When the patient is flushed and excited, and there are headache and confusion of the mind, immediate relief follows the application of the ice cap in a large

* See the remarks on cold affusion in Chapter IV., on Congestive Headache.

proportion of cases ; the high sthenic action is reduced, and the face loses its florid appearance and becomes peaceful and calm. If bronchial irritation and cough are threatening, they rapidly subside, and the excited action of the heart gives way to a more steady and regular movement, whilst the pulse is also reduced in force and frequency. If the temperature has been steadily rising, it usually begins to fall perceptibly, and if not at once, it does so in the course of an hour or two, unless the elevation is due to septic causes ; and even in nearly all cases the ice cap may be said to check the rapidity of the rise, at whatever stage of the pyrexia it is applied. When the cerebral symptoms are relieved, and the ice cap is hastily discontinued, the head frequently becomes again hot and uncomfortable, until it is reapplied. Patients are in the habit of begging for it during their recovery, whenever they have once used it ; and in many other cases of cerebral hyperæmia which have been caused by alcoholic indulgence, and other causes of nervous exhaustion, with high temperature and febrile disturbance, it is useful. The headache of active cerebral congestion, and the nervo-hyperæmic headache in the acute and early stages, yield more quickly to the ice cap than to all the drugs in the pharmacopœia ; and when this is not obtainable, Dr. Chapman's spinal ice bag is an excellent substitute.

It will be seen, it is to be hoped, from this chapter, that the treatment of a case of hyperæmic headache

cannot be conducted haphazard, or by the experimental administration of some of the drugs, vaunted as cures for "all forms" of cerebral pain and irritation. No cases demand more painstaking and thorough investigation by the clinical physician. His first duties are, with all care and faithfulness, to picture to himself the pathological changes and causation of the malady in each individual case, and then to combat with the symptoms, not only by the judicious use of drugs, but also by the regulation of the diet, and daily routine of life and business of the patient.

CHAPTER III.

SYMPATHETIC HEADACHE.

Extreme Frequency of this Variety of Headache, particularly in Women who suffer from Menorrhagia and Uterine and Ovarian Irritation—Sympathetic Ganglia of the Uterus—Its abundant Nerve Supply—Effects on the Cerebral Vessels of Section and Galvanisation of the Cervical Sympathetic—Researches of Dr. Brown-Séquard and Professor Bernard—Examples of Headache attributable to Ovarian Irritation—Typical Specimen of Sympathetic Headache from taking Ice into the Stomach mentioned by Dr. Symonds.

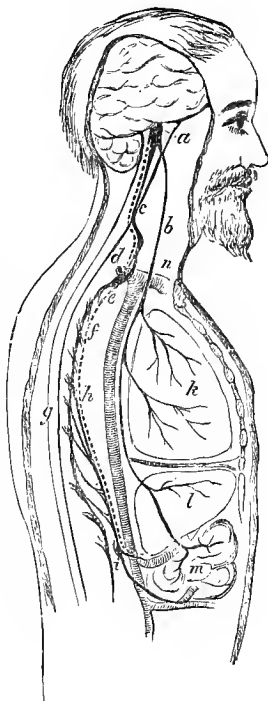
Occipital Headache.—Causes of Pain in this Locality frequently due to an Affection of the Occipital Nerves—Its Significance when of long standing—Mr. Hilton's Opinion of Pain at the Back of the Head as a Diagnostic Sign.

Dyspeptic or Biliary Headache.—Nature and Origin of—Effect of Sympathetic Action in provoking Cerebral Disturbance—Functions of Pneumogastric and Ganglionic Nerves—Relation of Vascular Excitement to Nervous Exhaustion—Effects of Aperient Medicines—Stimulating Drinks and Suppers—Use of Emetics in cutting short the Paroxysm—Alteratives—Alkalies—The Mineral Acids—Quinine—Aconite—Pepsine.

IN well-marked examples of this headache, irritation proceeds at a distance from the sensorium, as in the case of decayed teeth, faulty or arrested digestion,

and ovarian excitement. The headache is dependent on these excentric sources of irritation, and the most perfect examples of it happen only when the nervous system is already delicate or impaired.

Diagram showing the course of the vaso-motor nerves of the liver, according to Cyon and Aladoff. These nerves are indicated by the dotted line which accompanies them. *a*. Vaso-motor centre; *b*. Trunk of vagus; *c*. Passage of the hepatic vaso-motor nerves from the cord along the vertebral artery; *d*. Fibres going on each side of the subclavian artery, and forming the annulus of Vieussens; *e*. First dorsal ganglion; *f*. Gangliated cord of the sympathetic; *g*. The spinal cord; *h*. Splanchnic nerves; *i*. Coeliac ganglion, from which vaso-motor fibres pass to the hepatic and intestinal vessels; *k*. The lungs, to which fibres of the vagus are seen to be distributed; *l*. The liver; *m*. The intestine; *n*. The arch of the aorta.



Abundant instances might be adduced to prove how impressions are conducted along the pneumogastric nerve and the great sympathetic. There is, so to speak, a sort of influence travelling through many

channels, and these two especially, till it reaches the brain, where it changes the conditions of repose into heightened sensibility and morbid exaltation. This influence, when once excited, produces modifications in the brain, by weakening its inherent strength. The nature of these changes, and the relations that exist between organs so remote and distinct, must be recognised before we can ascertain their mutual relation, and how an antagonism in their functions is produced.

A nervous headache is as often sympathetic as it is idiopathic ; that is, it is as much the sequel of faulty action in a distant organ as it is in the brain itself. Sympathetic headache is of frequent occurrence in women of excitable temperament, and is periodically excited in them when the uterine loss is natural, or scanty, or excessive ; and hence we must seek for an explanation in the cerebral functions themselves. Women are often to be met with who suffer from it at these times ; and then the headache and sickness are both intense. The sympathy between the stomach and encephalon is so great, that a little rich food, or noise, or a shock, or fatigue, or exertion during the digestion of a meal will invite an attack. These people are naturally nervous, and in many instances it will be found on inquiry that the parents on one or both sides of the family have equally suffered ; or insanity or nervous disease has carried off some members of it. They have perhaps led an anxious life from an early period of their career, and have taxed the intellect

inordinately, when the growth of bone and muscle were most actively proceeding.

The patient who is eminently nervous asserts that her complaint is bilious ; and although in such a case as that just referred to, sickness begins immediately with the pain, it proves no more than this, that the extreme susceptibility of the cranial nerves responded to the impression made upon the gastric nerves by the food that was taken. Not, however, that the act of digestion is necessary to originate the pain ; for too long fasting or a continued train of unhappy thoughts will invite it. In a patient aged thirty-nine, who consults me from time to time, the pain begins as frequently in the left temple as in the right, and as often in the occiput as in either of these places. This sympathetic headache comes on simultaneously with the catamenia, although the function is regular. It is excited by ovarian irritation, and differs in no respect from the nervous form, except that there is a greater chance of cure in these cases than in those we may designate as idiopathic ; as with the cessation of the catamenia some physiological change may take place in the constitution which modifies the whole functions of life, and the head is no longer excited to morbid action.

Within the muscular walls of the uterus are imbedded numerous sympathetic ganglia, acting as originators of evil, alone or in concert with the cerebro-spinal system. When, from the periodic nature

of the menstrual functions, more blood is determined to the uterus than in the intervals when vascular energy is less marked, there is at the same time a greater evolution of nerve force, which involves it in irritation, and from thence the irritation is conveyed to the sympathetic filaments which accompany the blood vessels of the brain. When these headaches are threatening, the sympathetic nerve is engaged in regulating the supply of blood to the uterus, and its influence is exerted in increasing or lessening the amount of secretion. The patient, too, feels cold and shivering, as is the case during the cold stage of intermittents, and there is a diminished supply of blood to the surface: the secretions are scanty, the pulse is feeble, and the extremities are cold. These are striking manifestations of those conditions of headache over which the sympathetic system presides, uniting distant organs in their sympathies, acting as the conductors of impressions, and giving rise to the sensation of pain, either alone or through the medium of the cerebro-spinal nerve fibres, which are closely united together in all parts of the body.

The lectures delivered by Dr. E. Brown-Séquard * a few years ago throw much light on this interesting subject. Professor Bernard found, from experiments he performed in 1851, that, when the cervical sympathetic nerve was divided, a considerable afflux of

* 'On the Physiology and Pathology of the Central Nervous System.' —*Lancet*, Lecture IX. vol. ii. p. 441, October 30, 1858.

blood in the head took place in those parts beyond the point of section of the sympathetic.

Dr. Brown-Séquard (who afterwards repeated the same experiments with like results) attributed this to the influence of the nerves on the walls of the blood vessels, the latter becoming paralysed after section of the sympathetic. He moreover found, as he anticipated, by another experiment, that galvanisation of the nerve led to the opposite effect, the blood vessels contracting and the temperature and the blood in the vessels diminishing. Apart from any knowledge of Brown-Séquard's discovery, Professor Bernard soon afterwards announced that he had seen galvanisation of the sympathetic nerve have precisely the same effect: and this was corroborated by the researches of some British physiologists; so that it came to be acknowledged by different investigators that, whilst galvanisation of the sympathetic led to the contraction of the blood vessels, section of the same nerve produced the reverse effects.

Dr. Brown-Séquard sums up the phenomena briefly under the following heads:—

<i>Section of the Nerves.</i>	<i>Galvanisation of the Nerve.</i>
1. Dilatation of blood vessels.	1. Contraction of blood vessels.
2. Afflux of blood.	2. Diminution of blood.
3. Increase of vital properties.	3. Decrease of vital properties.

Dilatation of the blood vessels, after section of the nerve, necessarily increases the quantity of blood passing through these vessels in a given time, and

produces an excessive amount of cerebral congestion. "The hanging down of an animal, by holding it by its hind legs, in producing a congestion in the head, produces very nearly all the effects of this section." *

From these experiments it is apparent that the action of the sympathetic nerve exerts an extraordinary regulating effect on the conditions of the blood vessels of the brain, and through them regenerates or impairs the properties of the nervous matter.

"However, we are ready to acknowledge that there are other causes of active circulation in the head, after the section of the cervical sympathetic, besides the paralysis of the blood vessels. The very fact that there is more blood, producing an increase in nutrition and secretion—a fact which depends chiefly, as we have said, upon the paralysis of blood vessels—produces an increase in the normal *suction power* of the capillaries. In other words, the great afflux of arterial blood is itself, through the increased chemical changes of nutrition and secretion, a cause of attraction of arterial blood. To this cause another one of the same kind ought to be added: it is, that as there is more blood the temperature is increased, and as the temperature is augmented the chemical changes, which are a cause of attraction of blood, are also augmented. From this statement it may be con-

* 'Sur les Effets de la Section et de la Galvanisation du Grand Sympathique.' Paris, 1854.

cluded that the primitive, and, I may say, by far the principal, cause of augmentation in the afflux of blood is the absence of contraction of the blood vessels, which allows this liquid to pass easier there than elsewhere." *

In other persons who suffer from a sympathetic nervous headache, the pain is of a continual shooting character, as though a nail was being driven into the head. It is neuralgic, following the course of a particular nerve or branch, till it locates itself in the centre of the nervous system. It is more severe in the morning and evening than during the rest of the day, and the sight is confused and dim. The pain may commence over one ear, shoot up to the top of the head, and then extend backwards to the occiput. The pain is sometimes of a smarting character, and is attended with a sinking sensation in the stomach. Any stimulant, as a little beer or wine in the middle of the day, will bring it on. Although worry, hard work, and continual anxiety invite these headaches, the patient is not necessarily fidgety or irritable, and the attacks are unattended with sickness. A patient, who suffered in the way I have described, said, "I have two sons at sea, and if I could get over the idea that I should not see them again, I am sure I should not suffer so frequently." When with this anxiety of mind the catamenia are too

* 'On the Physiology and Pathology of the Central Nervous System.'
—*Lancet*, Lecture IX. vol. ii. p. 442, October 30, 1858.

active, we have the best instance of sympathetic nervous headache. The patient, being sleepless and unable to obtain rest, will pace the room all night, and tell you that her senses are departing.

Anomalous sensations in the head, of various kinds, are complained of by some persons.

An unmarried woman, thirty-three years of age, who was under my care in June, 1876, with a sympathetic nervous headache, felt on lying down a noise in her head like the ticking of a watch, which she never experienced at any other time. It sometimes seized one temple, and then the other; sometimes it fixed itself in the forehead, and sometimes it was seated over one ear (clavus); there was also the sensation of a heavy weight at the back of her eyes, but there was no actual pain. The patient had been subject to bilious headaches since she was a child, and the attacks, until a few years ago, always ended in the bringing up of bile. Formerly the headaches came on at every catamenial period, and now they do not happen oftener than once in three months. The tongue is furred, and there is some flatulence after meals; but there is no uterine ulceration or leucorrhœal discharge worth mentioning. Nothing is clearer than that this case owed its origin to ovarian irritation; but it is inexplicable why the pain should now recur only once in three months, instead of at each catamenial period. The patient derived great relief from the bromides of potassium and

ammonium, and for a time lost the ticking sensation altogether ; but when she was over fatigued, immediately she laid her head on the pillow, there was a buzzing sensation in the ears, and if she looked upwards she was giddy. When there was pain at the back of the head there was always giddiness, and a queer sensation which she was unable to define.

Here is another case in which ovarian irritation and uterine loss have produced a sympathetic headache, and I give it as an illustration of a group of cases which are of common occurrence. The patient, E. S., thirty-one years of age, thin and pallid, who has had one child, suffers from an excess of catamenial loss. Her headache has now been continuous and severe for six weeks, but she has suffered more or less since she was fourteen, and dates the commencement of it from the time when the catamenia first appeared. This has always been frequent and excessive in quantity, and she is scarcely free from a headache, when the return of the catamenia brings it on again. Between the periods there is a great deal of leucorrhœa and pain in the back. The pain begins with the period, in the pit of the stomach (solar plexus), with the sensation of a heavy and oppressive weight, which is speedily followed by headache (generally in the left temple and side of the head), as though something was being driven into it. If it lasts long, the pain extends over the whole head, particularly the occiput, which she constantly throws

back against the spine, or on one side to obtain ease. When the pain is severe, she is always sick and deaf, and there are noises in the ears like the roar of the sea or the sound of a distant howling wind. At the time of these headaches the bowels are obstinately costive, and she cannot get relief till they have acted ; the pulse is weak, and the hands and feet are cold. When the pain is coming on, the pupils are contracted and sensibility is increased, the head is hot, the face is flushed, and the bowels are torpid. When they act freely, and no food has been swallowed for some time, her face is as pallid as marble.

It can scarcely be contended that these cases were not due to uterine and ovarian irritation. In one case we have seen that no headache was complained of till the menstrual period was established, and from that time it recurred periodically. In the last case to which I have referred, the patient had filled a hard and worrying situation for years, and the catamenial losses were always considerable ; so that the continuance of two depressing causes fully accounted for the general tone of the nervous system being lowered, and for a predisposition to headache.

But it is doubtful whether any excitement or disturbance of the uterine functions would solely produce these headaches, unless the nerves of the brain were morbidly irritable, for I have known the general health greatly reduced by losses of blood, and menorrhagia persist till the quality of the discharge became

almost colourless, and the patient blanched, without any headache supervening.

Many diseases have a tendency to spread and extend from one part to another. Whether the duodenum or any other portion of the intestinal tract is the seat of offensive and irritating secretions, or whether the uterus and ovaries are morbidly sensitive, the local disturbance is exceedingly prone to increase, and involve contiguous and even remote organs in derangement. Irritation arising from these and similar sources, travels by the sympathetic to the brain.

In cases of true sympathetic headache the susceptibility to pain is far greater from some causes than it is from others, according to the state of the patient's health at the time the attack is provoked. If a person subject to headache sits down exhausted to his dinner, he will probably pay the penalty of an attack for taking into his stomach a meal when the gastric nerves are over-sensitive, and the secretion from its walls, instead of being clear and acid, is tenacious and alkaline. But in another person such remote irritation may not have this effect; whilst exposure to cold or the strong light of a theatre would bring on an attack at once.

"A typical specimen of sympathetic headache is presented in that form, more than once adverted to, which supervenes on taking ice into the stomach. Within an hour or two, sometimes sooner, pain will come on in the supra-orbital ridge of the temple,

attack the eye, dip down into the upper jaw, or extend itself over one lateral half of the head, acquiring the violence of a *tic-douloureux*. The origin of this pain proves unquestionably how an impression may be made on the nerves of a distant organ, which, without producing any immediate inconvenience in that part, is conveyed to distant organs, and lights upon some particular set of nerves ready to take offence from such a cause, but which have shown their sensibility to disturbing causes in no other manner." *

Occipital Headache.—It is a question of the gravest importance in ascertaining the cause of headache to trace the connection and distribution of the affected nerves. How many persons give us a clue to the nature of their pain by fixing upon the nerve from which it springs! Headache, with deep-seated mischief going on within the head, may involve the third nerve at its origin, and produce such changes of the globe and eyelids as to enable us to recognize with certainty the exact seat of the lesion. As the pain of headache is referred to the forehead, the temples, or to one side of the head, the fifth nerve may be taken as a tolerably accurate indication of the cause of the pain; so that, when there is pain at the back of the head, it must be often due to an affection of the cervical nerves and their branches. "Thus pain in the anterior part of the head would suggest that the cause must be somewhere in the area of the distribution of

* Symonds, 'On Headache.'

the other portions of the fifth nerve. So if the pain be expressed behind, the cause must as assuredly be connected with the great or small occipital nerve, and in all probability depends on disease of the spine between the first and second cervical vertebræ." * This is exactly the opinion we might expect to receive from a surgeon ; for the pain at the back of the head is not of common occurrence in the pure forms of idiopathic headache. When the nervous system has become exhausted, and the patient is low and depressed, the occipital region is more frequently affected ; hence it is common in some cases of nervous headache. It is not to be included as a symptom among the cases that ordinarily present themselves for advice. Persons, however, may experience periodic nervous headache for upwards of twenty years, and the pain on no occasion extend behind. When pain is present in this locality, it will frequently be found to follow the track of the cervical nerves ; and the neck, from the first to the last cervical

* 'Lectures on Pain and the Therapeutic Influence of Mechanical and Physiological Rest,' by John Hilton, Esq., F.R.S.—*The Lancet*, vol. ii., 1860, p. 303.

As corroborative of the opinion of Mr. Hilton that pain at the back of the head is sometimes owing to organic disease, I may briefly mention the case of a consumptive patient who came under my care in 1869. He suffered from the most excruciating pain at the back of his head, which he could not move for weeks together. About two months before his death the pain abated, and he then mentioned to me that his neck made a grating noise when he slightly rotated his head, which he could now do without causing any pain. After death the first and second cervical vertebræ were found carious.

vertebra, is often tender and stiff. The pain extends over the scalp to the back of the head, in the direction of the occipital nerves. The free anastomoses which take place between them and the auricular and temporal branches of the fifth nerve, quite account for the way in which the pain travels from the front to the back of the head. Now, I am of opinion, that when the occiput is the seat of pain in headache, it may be considered to arise from an affection of the cervical nerves and their occipital branches, if the pain is superficial and the nervous sensibility is increased. Pain at the back of the head, as we have seen, may be owing to disease of the spine, though I apprehend that it can, over and over again, be ascribed to no other cause than a hyperæmic state of the vessels at the posterior or under surface of the brain, or of the cerebellum itself, where the veins and sinuses are too full of blood, and the nervous matter is deranged in consequence.

The pain of headache may shift very rapidly from the temple to the occiput, and from the occiput to the temple. This has been attributed frequently to decayed teeth; but I have met with several cases of nervous and neuralgic headache, where the teeth are sound. In the case of a lady so suffering, artificial back-teeth had been worn for years, and no toothache had been experienced. From what has been stated, it is evident that the vaso-motor branches of the temporal artery are disturbed when the pain is in the

temporal region, and those of the occipital artery, when the pain is in the occipital region.

Occipital pain is sometimes present in the headache of *acute congestion*, and the patient will even cry out on any attempt being made to move him, or examine the seat of suffering. In the case of a gentleman, twenty-eight years of age, who came under my care in December, 1876, the pain was described as like the beating of a hammer, over the greater portion of the head, which was hot. The pain at the occiput was deep-seated, and limited to the region of the cerebellum; the muscles at the back of the neck were also stiff, and the patient could not rotate his head in the smallest degree. This is a symptom frequently met with in neuralgic, or one-sided headache. The chief additional symptoms were constipation, slight elevation of temperature, incessant vomiting, and a large, slow, and labouring pulse—not exceeding fifty-two beats per minute. I found free purgation by calomel, and an open blister at the back of the neck, over the upper cervical vertebræ, gave much relief. The first symptoms of improvement were a more frequent and natural pulse, and a heavy, throbbing, deep-seated pain, changing its character and becoming paroxysmal in the course of the right temporal and supra-orbital branches of the fifth nerve. I now think that six leeches applied to the back of the neck, at the beginning of the illness, would have given the patient much earlier relief.

When *occipital headache* is associated with atonic indigestion, and a clean tongue, it is often relieved by an active aperient, and nitro-muriatic acid. Iron and quinine, as a rule, are not beneficial.

Miss C., a single lady, thirty-three years of age, came under my care in January, 1885, with occipital headache, which she had had upwards of a year, and was seldom free from it. She was a schoolmistress, and attributed the attacks to overwork and great responsibility. The pain always began over the occipital protuberance, where she felt the pulsation, and great stiffness of the muscles at the back of the neck. After a time the pain moved to the left side, sometimes to the vertex, but never to the forehead. She had a worn and anxious look, and the pulse was weak. The eyesight was that of a person sixty years of age. The catamenial periods were frequent, and the pain was worst at these times. In the course of three months the pulsation involved the whole head, and she lost it in the temple. This case, like many others of a similar kind, I put down to the "incurable class," a year's continuous treatment having done no real good. In December, 1887, her general health had much improved; the attacks of headache were less frequent and severe, which she attributed to rest of mind. Bromo-cafein always afforded relief. Mrs. H., thirty-six years of age, consulted me in October, 1886, for severe headache, which came on from great sorrow at the loss of her only child. The patient was

of nervous temperament, and inclined to be hysterical. Here the pain was chiefly over the occiput, with stiffness of the posterior cervical muscles, and a feeling as though the brain was being done up with pins. In this case the catamenia were excessive, but there was no vomiting.

Dyspeptic or *Bilious Headache* is also termed *Sympathetic* or *Sick Headache* by some authorities, and I think rightly so, because vomiting often dispels the pain like magic, the source of irritation being so removed. No headache, however, ought to be termed *bilious*, unless there is so copious a secretion of bile that it either accumulates in the duodenum or regurgitates into the stomach, or the skin is yellow from its absorption into the blood. Dyspeptic headache has its origin in imperfect digestion, and arises either in the stomach or duodenum from the irritating and disturbing of the nervous apparatus of the alimentary canal by the resulting depraved secretion. Indigestion impresses itself on the sensorium by sympathetic action, and originates pain in it; but, though this arises in a few persons only, and not in all whose habits are irregular in eating and drinking, it must still be accepted that there is a tendency on the part of the nervous centres in the brain to be so impressed. A morbid impression conveyed through the sympathetic nerve to the brain would excite disturbance, and act as an agent of transmission.

All the processes of life must be carried on evenly

and orderly to insure health. The circulation cannot continue with regularity unless digestion and respiration accord with it: the one is dependent on the other, and the nervous connections of the viscera, if arrested or deranged, propagate the disturbing element to the cerebro-spinal system, through the ganglionic nerves. Thus the unity of the whole is apparent through the intimacy of the physiological relationships; and when we consider for a moment how the action of the heart is disturbed in its functions by derangement of the sympathetic system, it shows clearly how inflammatory or other states may originate disturbance, and produce painful sensations in a distant organ.

The facts which are proved concerning the functions of the *par vagum* do not warrant the drawing of any exact or precise conclusions from them. What we have to say, then, in reference to the part it plays in the digestive process must be to a great extent uncertain and problematical. It consists of a motor and a sensory tract, closely united together at their origin in the brain, the one tract being destined for voluntary, and the other for involuntary motion and sensation. This gives it a wider range of action, and its disturbance is manifested by a variety of peculiar sensations, from severe pain on the one hand to exalted sensibility on the other. Excitation of any sensory branch of this compound nerve, after having reached the nervous centre, may be reflected

to any part of the periphery, or even to some part in connection with it. So closely, then, is one part of this nerve associated with other parts, that irritation experienced in any single branch may be conveyed along it, and felt in the most distant portion of the nerve's periphery. This kind of irritation, set up by some change or alteration in the trunk or periphery of the various sensitive nerves, is analogous to those cases of reflex paralysis mentioned by Dr. Brown-Séquard. Many paralytic affections (and especially paraplegia) are due, not to disease of the spinal cord or its membranes, but simply to reflex irritation, starting from a sensory nerve or its branches, which have been irritated or excited; and thus we have cases recorded of paraplegia from the cutting of a molar tooth during the second dentition (West, Kennedy, Brown-Séquard), from enlargement and displacement of the uterus, or from ovarian excitement; in hysterical paraplegia, stricture of the urethra, and intestinal worms. These morbid states must take place through the medium of the nervous system, and not through the general circulation, or the paralysis would extend upwards. A case of paralysis of the lower limbs, due to synovitis, from the extension of irritation in the left knee-joint, is described by Brown-Séquard.* Now, all these cases are caused by the excitation of an afferent nerve,

* *Paralysis of the Lower Extremities*, by C. E. Brown-Séquard, M.D., F.R.S., 1861, p. 18.

and the reflex paralysis continues so long as the excitation persists. The morbid effect on the muscles is of a transient character, unlike the spasms, twitching, and anæsthesia which accompany the paraplegia of myelitis, where all parts are involved, and the tendency of the disease is towards a fatal termination. Mr. Hilton has also recorded the case of a boy who was lame in his right leg, and could neither put it to the ground nor control its movements, yet the real pathological cause was seated in the brain, and not in the limb; the paralysis, in fact, being nothing more or less than a sympathetic disorder occasioned by the febrile state. Mr. Hilton has also shown how the exact seat of disease in the hip-joint may be indicated by the spot on the knee where the pain is experienced.

The pneumogastric is no exception to this rule, and irritation in the stomach will often occasion a cough—the well-known stomach cough. Sir Thomas Watson relates the case of an epileptic, whose fits ceased with the expulsion of a tapeworm. “I know that a physician of my acquaintance cured a case of epilepsy in this way, somewhat to his own surprise. Without having in his mind any notion of worms, he thought it might be well to purge his patient, who had laboured under epilepsy for some time, with the *oleum terebinthinæ*. The patient, who is the brother of a person holding at present a high office in this country, was residing two or three miles

out of town. In the middle of the night the doctor was summoned to him in a great hurry; the messenger said he was supposed to be dying. He was only intoxicated, however, by the free dose of turpentine that he had swallowed; the next morning he voided into the close-stool a large tapeworm, and he has never had epilepsy since. A nobleman residing in Cambridgeshire was long epileptic, and he too got rid of his epilepsy and of a worm at the same time.* Irritation, then, at a portion of the periphery of the pneumogastric may produce either centric or peripheral manifestations. The headache of dyspepsia thus becomes intelligible. Seeing that the nerves of the stomach are derived from the pneumogastric and the sympathetic, we are in a position to understand the immense influence they must exert on the secretions of this viscus. The branches of the pneumogastric, after perforating the muscular coat, ramify in the submucous areolar tissue, until they are lost under the surface of the mucous membrane. "Each unites, not only with large and small branches of its fellow, but with the sympathetic nerves of the stomach, at all stages of their distribution visible to the naked eye—from the solar plexus and semilunar ganglia to the secondary and tertiary offshoots of those around the vessels, and even to their branches in the areolar coat of the stomach."†

* *Principles and Practice of Physic*, 4th Edition, vol. i. p. 663.

† Brinton, *On Diseases of the Stomach*, 1864, p. 24.

The distribution of the sympathetic branches is much the same, and, after perforating the muscular coat, the plexuses disappear in the submucous tissue, like the gastric branches of the par vagum. The pneumogastric gives off branches which have been traced into the plexus myentericus, and so brought into contact with the intestines. Any irritation, then, of the stomach and intestines may produce headache by sympathetic disturbance.

The influence which the pneumogastric nerve exerts on the action and secretions of the stomach is both interesting and important, and the subject may well be considered in this place. The extensive distribution of the par vagum, and its intimate connection with the sympathetic system, gives it a wide and diversified action ; it changes local into general influences, and possesses relations which involve distant organs in excitement and morbid change. The pneumogastric nerve, both physiologically and pathologically, is never lost sight of in any organic or functional disorder, and least of all should it be so in an affection like headache, when its communication with the brain and stomach is so closely united, and the derangement of all parts which it supplies becomes evident in the painful sensations we experience when it is irritated or inflamed.

The mucous membrane of the stomach in a healthy condition is of a pale colour when at rest ; but immediately an irritant, in the shape of food, comes in

contact with it, the mechanical action induced by the friction and motion causes the vessels to dilate, and the surface to become red. The thin, acid, transparent gastric secretion is poured out, even after the nervous supply is cut off from without, though it is largely concerned in the secretion, as we shall see in considering the action of the pneumogastric nerve on the walls of the stomach itself. During fasting, when the stomach is at rest, there is another secretion furnished by its walls, which is thick, ropy, and alkaline. The various stimulants, as ether, alcohol, wine and spirits, mustard, and a host of other excitants, cause the gastric juice to issue forth in abundance, and to perform a necessary part in the digestive process. Irritation of the afferent sensory fibres causes the gastric vessels to dilate, and the mucous membrane to become reddened; whilst Bernard found that section of the vagi caused pallor of the surface; but it would appear "that the vagus contains two sets of afferent fibres, one of which increases, whilst the other diminishes, the degree of contraction of the gastric vessel." *

The close connection of the par vagum with the sympathetic nerve of the abdomen, uterus, and ovary induces reflex irritation in the stomach, which is so commonly observed in affections of these organs—as dysmenorrhœa, ovaritis, and uterine contraction.

* See 'The Action of the Vagus on the Stomach,' by Dr. Lauder Brunton.—*Handbook for the Physiological Laboratory* (Text 1873), p. 493.

When the nerve is divided or injured, any of the parts to which it is supplied may be affected, by violent or spasmodic action, retarded motion of the heart, or congestion or inflammation. Irritation of the gastric branches induces vomiting, but section arrests it, and causes distension of the viscus.

As the par vagum is in immediate relationship with the chief cerebral nerves (the glosso-pharyngeal, the fifth, the seventh, the third, the ninth, and spinal accessory), we may in a great measure realise how its sympathetic disturbance may involve organs which own a different nerve supply, and are only brought into relation with it through nerve inosculation. The union of the par vagum, therefore, with other nerves may set up far away reflex irritation, as we have seen, but more particularly with the fifth, and with that state of irritability and supraorbital pain which we have seen to follow the introduction of ice into the stomach.*

The alliance of the par vagum with the ganglionic supply to the stomach enables us to judge of their continued effects upon the pulse and cardiac circulation; in many acute diseases the cardiac plexus and the solar plexus are brought into close and immediate sympathy, which is inseparable between them. The diseases of the stomach and abdominal viscera produce their full share in prostrating the vital powers, rendering the pulse imperceptible, and causing coldness of

* See p. 101.

the surface and syncope. No better illustration can be found than the effect which a disturbed stomach or a severe bilious attack has on the cardiac circulation, when the nervous power is exhausted, and the vessels are weak and dilated. Hence it is that the healthy action of this nerve is essential for the steady performance of the digestive process ; and, when digestion fails, the nerve power will frequently be found at fault. If the strength of the constitution has been reduced from prolonged indulgence in alcoholic stimulants, the nervous energy is the more exhausted, and as the patient cannot assimilate sufficient food to keep the functions of life going steadily, the way is paved for chronic dyspepsia and degenerative changes.

The secretion of gastric juice is effected by the state of the nervous system, and sudden mental emotion is able to stop it altogether. The channel by which this is conveyed clears up any doubt or mystery attaching to the phenomena ; for the division of the trunk of the pneumogastric controls the secretion of gastric juice and the movements of the stomach. Though the experiments of physiologists, like Reid, Schiff, Budge, Longet, Bernard, Ravitsch, etc., show that the stomach gradually recovers its lost tone after division of the par vagum, the functions of absorption and assimilation are enfeebled for a considerable length of time. The division of the sympathetic nerves, also, does not arrest the functions of this organ. But continued disorder of one or other, or of both

these nerves, apart from any experimental deduction, proves, I think, to demonstration, that when pain is suddenly experienced at the pit of the stomach from the reception of bad news, they are so affected as to exert a most important influence on the digestive apparatus. The failure of nervous power is obvious enough in the fearful gastralgia and feeble digestion that render the life of some people a burden. I do not think that even the division of the par vagum at the œsophageal opening, or of the splanchnics in the abdomen of the lower animals without palpable and permanent effect on the digestive powers, justifies us in setting at nought the agency of the nervous system in man, and still more the importance of the pneumogastric in the production of reflex phenomena.

A genuine bilious headache is less common among women than men, who commit greater excesses in eating and drinking. Young people of both sexes are, however, liable to it. The pain comes on in the morning after a heavy meal the night before, or after drinking too much wine; or it succeeds a heavy midday meal, if the person is not accustomed to it; or if the food is hurriedly eaten, and exertion and fatigue follow it. The pain occupies the whole forehead and top of the head, which feel hot and sometimes burning. The face is flushed, and the temporal arteries throb. A heated room, or stooping, brings on extreme nausea, and aggravates the suffering. If the patient avoid taking food he may manage to get

through the business of the day ; but when evening arrives, if he attempts to eat, the pallid face is exchanged for one of vascular excitement, and the throbbing headache often culminates in a violent attack of vomiting ; after which, when the hope of alleviation has departed, he suddenly and unexpectedly falls asleep, and awakes next morning well. An attack of severe retching, with or without the discharge of frothy mucus and bile from the stomach, will sometimes remove the fit of suffering. Its duration varies from a few hours to three or four days. In some patients it frequently continues a week ; and the first sign of amendment is a desire for food, with the power to digest it. After the long continuance of severe gastric headaches, the vascular excitement gives place to nervous exhaustion, and as they become more frequent, the nervous element preponderates ; so that with the advance of years, the bilious character and the vomiting are exchanged for the type of headache which we shall presently describe. But one form of headache during its continuance may partake of the character of other types. That which begins as a purely bilious may end as a nervous headache, and that which begins as a nervous may terminate as a bilious headache ; so great is the sympathy between the stomach and the brain. Where the urine is turbid and high-coloured, and the complexion sallow, the cause may be traced in many instances to an accumulation of bile in the duodenum

or the blood, and a fit of vomiting will sometimes cause a large quantity to be ejected by the stomach.

Whatever the exact cause and nature of the headache may be, the nervous system has largely to do with it, inasmuch as some persons of the most irregular habits, with defective depurative organs, never have the sensation of a headache. I once knew a gentleman who was a martyr to gout, and had attacks which confined him to bed for six weeks at a time, and whose secretions were much deranged, as was shown by the dark bilious character of the evacuations, high-coloured urine, and foul tongue: yet this patient, who freely indulged in the pleasures of the table, and drank largely of wine, never within his knowledge felt the sensation of a headache. He was, however, one of the most nervously timid persons I ever met with, shunning the society of ordinary visitors, and at times he could not summon up sufficient courage to meet his oldest friends.

Causes.—The habit of continually taking aperient medicines by which the powers of digestion are enfeebled, indulgence in indigestible food and stimulating drinks, are common causes of this headache. A glass of beer, or a tablespoonful of brandy, will bring it on at any time in those persons who are predisposed to it, and where the digestive organs are easily deranged. Suppers, if persons are not accustomed to them, will cause disturbed sleep, followed by heat of head, extreme nausea, and headache on

awaking. Some of the worst forms of this headache have followed the excitement of evening parties, and the overloading of the stomach with indigestible food. Unwholesome food which temporarily disturbs or arrests digestion, will occasion acute dyspepsia in some persons, and such persons are extremely prone to this form of headache ; uneasiness at the stomach, faintness, depression of spirits, lassitude, and febrile excitement are to be reckoned among the prodromata. Then succeeds an oppressive frontal headache, with nausea and inability to face the light, or bear the slightest noise. In some persons vomiting ensues, and the patient finds immediate relief ; and in others colicky pains and diarrhœa expel the irritating matters from the intestines, and the patient loses the headache more gradually : weight about the præcordia, dislike of food, high-coloured urine, offensive evacuations, and a creamy fur on the tongue may remain for days after, during which the nervous system is more or less implicated, and confusion of ideas and vertigo, with a return of throbbing headache, follow any employment of the mind requiring thought and reflection. This headache may come on in a few hours after food, or the patient may go to bed comfortably, and either have disturbed and restless sleep, or wake up unrefreshed with a weight across the forehead, and forthwith the affection begins in earnest. A sense of cold and chilliness is felt about the scalp and face for a few hours, particularly

if nothing is put into the stomach ; but if such be the case, or as the day advances, the face becomes hot and flushed, and the patient is continually employed in applying cold wetted rags to the head for relief.

“The headache which appears in the course of the slighter attacks of this nature, often assumes a form with somewhat characteristic features, and which is familiarly known as the ‘*sick headache*.’ It is most common when acute exacerbations are superadded to the ordinary forms of atonic dyspepsia ; and hence it is most liable to affect those who are out of health, and whose digestions are weakened by sedentary employment, and who have a tendency to costiveness. It occurs, however, also in persons of apparently vigorous health, sometimes without apparent cause, but most usually after some indiscretion in diet, or after some of the causes most likely to arrest the digestive process.” *

Treatment.—In early life, when this headache is threatening, it can always be traced to some error in diet, and an emetic of sulphate of zinc or ipecacuanha brings relief in a couple of hours (Form. 108–109).† One grain of calomel, or three grains of blue pill taken on an empty stomach, will often mitigate the suffering in the head, though it may increase the

* ‘On Acute Gastric Catarrh,’ by Wilson Fox, M.D., F.R.S.—*A System of Medicine*, edited by J. Russell Reynolds, M.D., F.R.S., vol. ii., 1872, p. 869.

† One-tenth of a grain of apomorphia, injected subcutaneously, is the most speedy emetic with which we are acquainted.

nausea and loathing of food. As the day creeps on, the headache wears off. With the advance of years these headaches become less acute, but more exhausting and tedious in their recovery. Rest in bed, cold applications to the head, and an alterative pill, followed by an alkaline purge in the morning, suffice for their cure (Form. 81-19).

When patients are very bilious, and the conjunctivæ yellow, a good cholagogue purgative (Form. 79) will excite the action of the liver, and drain away a copious quantity of bile. A mixture of soda and bismuth with sal volatile will be useful to relieve flatulency and acidity (Form. 15). Where the bowels are irritable, a full dose of bismuth twice a day before meals is good (Form. 107). In the case of persons who are not strong, a few grains of carbonate of ammonia in water (Form. 16), or sal volatile, and chloric ether will sometimes arrest the symptoms at once (Form. 17).

If the headache is accompanied with atonic dyspepsia, and there is a clean tongue with weight and oppression at the epigastrium, the nitro-muriatic acid will be found serviceable before meals twice or three times a day (Form. 48). If flatulence is very troublesome, bismuth with nux vomica, and if there is constipation, a morning pill of aloes, nux vomica, and belladonna, or one consisting of aloes, capsicum, quinine, and ipecacuanha, are indicated (Form. 77-78). In some varieties of dyspeptic headache, Dr. Smith gives one minim of the tincture of nux vomica every

fifteen minutes for two or three hours, and he has found it most effectual. Where the extremities have been cold, and the pulse small and hard, a drop of tincture of aconite in a teaspoonful of water has fully answered my expectations in many instances. By dilating the vessels and favouring perspiration it has wonderfully relieved the aching brain. If the headache comes on soon after a meal from slowness of digestion, Dr. Smith gives half a drachm of saccharated pepsine in a wineglassful of sherry three times a day at meal-times.* I have given Morson's pepsine wine with great advantage at meals, and it certainly accelerates digestion and relieves nausea and gastric oppression.

* 'The Therapeutics of Headache,' by A. A. Smith, M.D. A Lecture delivered at the Belle Vue Hospital Medical College.—*Medical Record*, September 15, 1876, p. 390.

CHAPTER IV.

CONGESTIVE HEADACHE.

Physiological Distinctions between Congestion and Hyperæmia—Definition of the two States—True Congestive Headache is of a Passive Character—Seat of Pain and General Symptoms—Causes that invite Congestive Headache—Good Living—Sedentary Habits—Bronchitis—Asthma—Whooping-Cough—Tight Stays and whatever impedes the Circulation—Treatment consists in lessening the Supply of Blood to the Brain when in excess, and promoting its Circulation through the Vessels when their Tonicity is impaired—Purgatives—Saline Waters—Occasional Advantage of Venesection—Spare Diet and Avoidance of Stimulants in the active form—Counter-Irritation—Walking Exercise—Change of Air—Foreign Watering-Places—Aconite—Bromides of Potassium and Ammonium—Strychnia—Nux Vomica—Mild Preparations of Iron in Anæmic Cases.

IN the active variety this can scarcely be separated from the headache of active hyperæmia. It overlaps each of the other forms, active and passive hyperæmia ; yet it is not absolutely either. Congestion seems rather to be a dilated condition of the minute vessels, arterioles, venules, and capillaries, owing probably to some modification of the textures of the brain, by which they attract more blood to themselves than

they do in health. In active hyperæmia, or one form of it, the determination of blood is more sudden and energetic, and the symptoms are violent for the time it lasts; the temperature is higher, and the pulse quicker and stronger. The patient feels the whole arterial system throb and pulsate. As another and marked distinction from any form of congestion, the nervous centres are more susceptible, and this has a very determining influence on the vascular system, rousing the circulation more violently than in congestion, and increasing the functional activity of the affected part. Vital power and action are increased, with a less tendency to produce inflammation. It is a form of hyperæmia that does not lead to inflammation. The sensibility is heightened in proportion to the increased supply of blood.

Congestive headache occurs most frequently in plethoric persons, and those of a full habit of body; but it may happen to those who have a sluggish brain circulation, and in whom the vessels are habitually loaded. It is the form of headache that occurs at the commencement of febrile disorders, acute hydrocephalus, and threatening apoplexy; but in these latter cases it attracts less notice and consideration than the primary disease on which it depends, and is therefore to be considered as a secondary rather than as a primary affection. In its true signification it is a passive congestive form of headache, depending on fulness of the vessels of the

brain, and there is no better example than that which follows an epileptic seizure. I have met with it in country people who lead an active life and are of regular habits. Bilious and lymphatic temperaments are liable to this affection ; the face becomes bloated, the eyes are heavy, and the conjunctivæ injected ; the expression is heavy and sad, and the pulse full and soft, or weak, small, and accelerated. The symptoms are a dull and severe pain, extending from the forehead to the occiput, and great heaviness and stupor ; the suffering is rather limited than general, and is sometimes referred to a particular part of the head, which indicates congestion of one lobe or hemisphere of the brain ; the patient is apathetic and indifferent, and suffers from giddiness and noises in the ears. If he stoop or turn round quickly, he experiences the disagreeable sensation of vertigo ; his walk is apt to be over-cautious, and his nervous system is tremulous and susceptible. In persons who are advancing in life, hypochondriacal symptoms are of common occurrence, and the nights are restless and disturbed by frightful dreams. If the pain continues long, and does not yield to treatment, the patient loses strength, is depressed, and easily fatigued ; the pulse is irregular in force and frequency, and there may be palpitation and shortness of breath. The appetite is generally good, and the tongue clean and red, but the bowels are disposed to be costive, and the urine turbid and high-coloured. This form of headache is said by

some writers to occur in irritable and anæmic subjects, but I cannot say that I have frequently observed it in this class of persons. When it does occur in these states of constitution, the pulse is weak and frequent; there are flashes of light before the eyes, the skin is pale, and the tongue generally clean and bloodless. Sometimes weakly persons suffer from a dull continuous headache, during which the heart's action is violent, and the carotid and temporal arteries throb; but if congestion of the vessels of the brain exists, pain comes on in paroxysms, from sudden noise or exertion, and is transitory in its duration. An over-sensitive condition of the nerves, by causing a hyperæmic state of the vessels of the brain, analogous to the distension of the capillaries in blushing, may induce it.

The true headache of active congestion belongs to a general hyperæmic condition, and there is an excess of blood in the system, or it is propelled with an increased activity, which over-excites the cerebral tissues and causes pain. But in passive congestive headaches the circulation is at fault, and the tone of the system is deficient. Cases are often seen where the patient is nervous and weak, the expression heavy, and the face sallow and bloodless. The spirits are dejected, and the drooping eyes bespeak a sad and sorrowful condition of the mind. The blood is not propelled through the cerebral vessels with sufficient activity or force, in consequence of their imperfect

contractility, and hence they become overloaded without any extra power to propel their contents onwards. In cases of malarial poisoning, congestion of the brain is common, like that of the spleen and liver; the blood moves slowly, and the vessels are enlarged and distended in consequence of a loss of tone.

Cases of meningitis are recorded, which prove that there is no necessary connection between the locality and degree of headache, and the inflammatory lesion. Organic change may cause congestion—a condition brought about by very opposite causes, as over-exertion, mental distress, and debility of the vessels through which the blood is conveyed. Many cases of headache attributable to cerebral congestion can find no other explanation. Now, this congestion seems to be borne longer with impunity by a sensitive organ like the brain, than by any other tissue, where it would lead to excess of secretion or alteration of structure. The functions of the brain are altered (though it escapes injury), chiefly through functional disturbance of the nerves themselves, which may or may not produce an alteration in the vessels. The nerves in the form of headache are first involved, and any mental excitement will cause their disturbance; and as the blood vessels are in close and intimate relation with them, the capillary circulation quickly responds, and produces a state of hyperæmia. Under any degree of emotion these headaches are common enough, and the flushing of the vessels of the face and neck

indicates how they become overloaded under passion, or any kind of mental disturbance. The vehemence, again, of invective oratory, under a strain of deep thought and reasoning, excites the action of the heart, and forces the blood to the cerebral circulation, where it is detained, and keeps up the cerebral excitement. There are many persons (and it is especially so with nervous and irritable children) in whom intellectual exertion brings on a state of active congestion, which prevents them from following their work ; and if it is persisted in, changes may then ensue in the vesicular structure of the brain, which permanently damage or impair it. I possess notes of cases of fatal congestion of the brain and meningitis in children after a few days' illness. In each instance the attacks were preceded by slight headache and sickness ; but setting aside this significant symptom of brain mischief in early life, the other indications of failing health were too trivial to have given warning of the grave results to follow.

Causes.—The causes that invite congestive headache are a peculiar configuration of the body, such as when the chest is capacious, the shoulders high, and the neck short. The patient experiences shortness of breath in going upstairs, and is distressed with exertion. He is fond of good diet and stimulating drinks, and prefers sleep and sedentary habits to active exertion and scanty fare. This headache in its active form is not unfrequently seen in young healthy

women, whose catamenial losses have been suddenly suppressed through taking cold.* Whatever depresses the bodily powers and reduces the general strength, exhausts the system and induces debility of the vessels, favours congestion, and relaxes their tonicity and contractility. It is seen in both sexes when the constitution is broken down and shattered by indulgence, and in stout heavy persons, who have had attacks of bronchitis and asthma; in women who have borne large families, and whose nervous power is exhausted. During or after whooping-cough it is not uncommon when the attacks of spasm are violent, and the pulmonary complication is tedious and irksome. Persons who play the cornet, and other instruments requiring prolonged expiratory efforts, and the suspension of the breath for some seconds, are frequent sufferers. The now happily discarded stock worn by our soldiers a few years ago, induced this variety of headache; and any constriction about the neck, or the use of tight stays to compress the figure into a fashionable shape, will bring about the same evil by impeding the circulation.

Organic change may induce it, by disturbing the relations of the structures of the brain, and causing congestion and interference with the circulation. Congestive headache of a passive character is exemplified in hypertrophy and valvular disease of the heart, where we may frequently witness lividity of

* See Chapter V., on Plethoric Headache.

the features, distension of the jugular veins, coldness of the skin, and fulness of the temporal vessels. In a little girl, ten years of age, who was under my care with this form of heart affection, the headache was nearly unceasing, and the poor child only got relief by a free purgative and the lightest diet. The brain was overloaded with blood from passive congestion, and the blood interrupted in its return by the condition of the heart. Indeed, it appears to me that it is impossible to dissociate congestion of the vessels from any form of headache in some stage of its progress. The purely nervous headache in many persons, at its commencement, or shortly after, exhibits signs of congestion in the frequency and fulness of the pulse, the warmth of surface, the heat of the head and scalp, the tendency to vomit, in constipation, and in a greater or less degree of paralysis of all the functions. As the circulation of the brain is active, and the amount of blood within it is at all times great even in health, we may reason from analogy that the nerves are exceedingly liable to disturbance in those who are subject to headache, because it is possible, and not uncommon, for persons to have habitually a congested and sluggish circulation, through the brain and other cavities of the body, without experiencing the sensation of a headache.

Repeated epileptic seizures will also induce severe congestive headache. The headache which happens to the intemperate and those addicted to irregular

habits is of the congestive and hyperæmic variety. The vessels of the brain are overloaded by the entrance of alcohol into the blood; there is congestion of the stomach and of the liver also, these latter organs being first in fault. A hyperæmic condition of the arteries of the brain, arising from a diminution in the tonicity of the vessels, and causing severe headache, is not uncommon in those persons who exhaust the brain by prolonged study and excessive intellectual exertion. The brain is fagged, and never rested long enough for the vessels to recover their tone and vigour. Men of the strongest intellect and the most placid natures, when afflicted with this headache, become dejected and irritable, and exhibit traits of character which they have not previously shown, and a difficulty is felt in concentrating the mind on work; while the patient, if accustomed to walk vigorously, now finds that short distances tire him. He first has an uncomfortable feeling of pressure along the front and top of his head—an uneasy sensation, similar to that which is felt from extreme heat or cold. Later on, the headache is characterized by a heavy pain across the frontal region, dull and continuous. This is often succeeded by faintness and inability to walk. When talking, there is a sensation of weight over the brain, and numbness of the scalp. In short, the brain is being worn out; and if this continues, there is certainty of the patient sooner or later breaking down altogether. Long-continued

anxiety and the struggles of professional life, hopes disappointed and plans frustrated, will induce a state of congestion or hyperæmia of the brain and headache, which may become permanent, if the warning is not taken in time. For when the brain is constantly overcharged with blood, changes in the vesicular structure of the nervous matter are not unlikely to occur, which sometimes end in weakness of intellect.

Treatment.—In managing this variety of headache, the local as well as the constitutional symptoms must be carefully estimated. It will be necessary to inquire into the condition of the capillaries of the brain, and whether the blood is impeded in its passage through the circuitous veins and sinuses of the cranium. The age of the patient and the habits of his life will also demand careful consideration, before we can submit him to treatment with any prospect of relief. In the plethoric and robust, the quantity of blood circulating through the brain may be lessened by exciting the action of the secreting organs. A full dose of calomel and colocynth should be given at bedtime occasionally and a saline aperient during the day (Form. 80). A tumblerful of Apollinaris water, on going to bed, will stimulate the bowels to act more freely on the following morning, and cool and refresh the system. About twice a week, according to the circumstances of the case, two-thirds of a tumblerful of Friedrichshalle water, in a little lukewarm water, taken on rising, will

prove a mild and efficient purgative, and it answers exceedingly well in these cases.

The diet should be spare, and beer and spirits abandoned. Active exercise in the fresh air, and habits of early rising, should be enforced ; and these measures, when rigorously carried out, afford the best promise of relief.

Blood-letting, either general or local, is rarely if ever needed ; it being preferable to trust to abstinence, mild or active exercise in the open air, and due attention to the action of the liver and bowels. In the case of young plethoric women, I have known leeching the temples or groin prove advantageous. There are instances occasionally to be met with, however, where the patient is indolent and overfed, besides being too full of blood already. He is about the middle period of life, and is much averse to exertion or active employment of any kind. His habits of life having become more sedentary, it happens probably that the bowels no longer act so freely, the liver being habitually congested, and the circulation through it to some extent obstructed. Cases of this character may possibly be benefited by the abstraction of blood, but even here brisk cathartic and alterative medicines are most to be relied on (Form. 79-80-29). In one case that came under my notice, much benefit was derived from an open blister at the back of the neck ; but no measures will be availing unless the diet is restricted, and exercise is regularly taken in the open air.

In some cases of acute congestive headache, where the face is hot and flushed, the pulse firm, and the skin dry, the antiphlogistic effects of aconite prove of signal service, by inducing diaphoresis, and relaxing or partially paralyzing the vaso-motor system (Form. 26 *a*). Aconite depresses the heart's action, and by reducing arterial excitement, and diminishing pressure and tension in the vessels, it controls the amount of blood which circulates through the cerebral mass.

Congestive headache, from whatever cause it may arise, is frequently relieved by cold affusion, or the cold douche. From personal experience I can testify to the great efficacy which cold applications afford to the head when persevered with, how they relieve the suffering and invite sleep. Celsus was aware of this when he wrote, "*Capiti nihil æque prodest atque aqua frigida.*"* No local remedy in frontal headache has ever afforded me so much relief as two folds of linen saturated in very cold, or iced water, and kept constantly applied, so as to include the temples, the head being well elevated on a hard pillow at the same time.

When this headache is the result of overwork of the brain and prolonged study, change of place and scene will be desirable. The mind must have entire relaxation by easy travelling and the quiet amusements of the seaside. Foreign watering-places, where the air is pure and the waters are adapted to pro-

* Lib. i., cap. iv. p. 19.

mote the digestive functions, will amply repay a long visit.

It is in such cases as these, and especially in nervous and irritable subjects, that the bromides of potassium and ammonium are of such signal value.

I have known benefit derived from a combination of bromide of potassium and ammonium. A case is related of a gentleman who had intense headache, with a sensation as if the head was about to burst, with noises in the ears; but a mixture containing bromide of potassium, bromide of sodium, and bromide of ammonium, of each five grains, gave great relief. At the end of a week, the heart being weak, five minims of the tincture of digitalis were added to each dose. Professor Charcot combines these three bromides in much the same dose for epilepsy.*

If the patient is sleepless at night, the bromide of potassium will be of great service if taken just before going to bed (Form. 40); and if he is unsteady on rising in the morning, and dreads the fatigue and business of the day that is before him, the bromide of ammonium (Form. 25) will avert the headache which threatens with the morning light, and steady his nervous system in a remarkable way. In the case of a gentleman who suffers periodically from a subacute congestive headache, and who is also troubled at these times with flatulent dyspepsia, a full dose of the subcarbonate of bismuth in plain

* *The Lancet*, vol. ii., 1884, p. 47.

water twice a day, before the two chief meals, always controls the headache and general discomfort and flushing of the face (Form. 107).

In some forms of congestive headache where the pain is dull and frontal, and there is languor, chilliness, general discomfort, and distaste for food, two-grain doses of iodide of potassium in a wineglassful of water, and sipped in the course of ten minutes, are said to have a rapid and wonderfully good effect.*

When tonics are required, bark and ammonia, or ammonia and lavender, may be first ventured on (Form. 55-62), and in some cases they answer well. The mild preparations of iron are suitable if the patient is weak and anæmic (Form. 22-24), but they must be cautiously given in the intervals between the attacks, and the functions of digestion and assimilation should always claim a large share of attention during their administration.

* *Australian Medical Journal*, August 15, 1881.

CHAPTER V.

HEADACHE FROM PLETHORA AND INCREASED
VASCULAR ACTION.

Characters and Composition of the Blood in Plethoric States of the Constitution—Predisposing and Exciting Causes—Variability of the Symptoms according as the Disorder is of a Sthenic or an Asthenic Type—Prevalence of these Headaches at the Catamenial Periods and during Pregnancy.

Treatment—Natural Cure by Spontaneous Hæmorrhage from the Bowels, Nose, or Uterus—Occasional Necessity for Venesection and Cupping or Leeching in Active Plethora—Saline Aperients to excite the Eliminative Organs—Importance of Abstemious Habits and a Limited Indulgence in Animal Food—Fish and Vegetables, and the Influence of Diet on the Composition of the Blood.

IN this variety of headache there is an excess of blood in the whole system, and throughout every organ of the body. It is allied to the congestive form ; but here there is an increased quantity of blood in the brain, without any corresponding repletion of the rest of the vessels of the body. The condition is essentially dependent on the cerebral vessels partaking of the general fulness, and is not due to the determination of blood towards the head in particular.

The redundancy of blood in the brain excites morbid action of the nerves and causes headache, whilst the general plethoric state leads to indolence and insufficient exercise; and with defective action of the skin, liver, and bowels, the fulness of the vessels is continually kept up. When the capillaries are too full they favour congestion, by the exudation of their contents through their thin membranous walls.*

The predisposing causes are over-indulgence of every kind, stimulating foods and drinks, want of regular exercise, and mental lethargy. Among the exciting causes may be enumerated any circumstances that determine blood to the brain and internal organs. The suppression of any accustomed discharge, as epistaxis or hæmorrhoids, will induce it. I knew a lady, forty years of age, short, stout, and of full florid habit, who only obtained relief from violent throbbing headache by a great uterine loss, or profuse bleeding from the nose till she was blanched and faint. On more than one occasion she was on the verge of apoplexy, when the hæmorrhage which relieved her

* It is important to remember that the blood in plethora is different in its composition from what it is even in active hyperæmia. With the increase in the general mass, there is also a larger number of red corpuscles and fibrin. According to Dr. Payne, however, the fibrin is somewhat diminished from deficient arterialization (*Jones & Sieveking's Pathological Anatomy*, p. 42). The quantity of water is very considerably less, so that after venesection the coagulum is large, and the serum scanty. In the asthenic form of plethora the coagulum is softer, because the tendency to an approximation of the red particles is decreased, and they are more easily drawn asunder, by the loss of attractive force and the want of cohesion between the solid and fluid parts.

came on.* There had been for some days previously singing in the ears, and a throbbing and bursting sensation in the head. Purging and low diet kept the symptoms in abeyance, but never brought so much relief as this unloading of the general circulation. A fit of passion in a sanguine person, or exposure to the heat of the sun, or overcrowded rooms and public assemblies, will excite this headache, if there be a predisposition to it.

Persons who suffer from this sort of headache look well and strong ; they are usually stout and of short stature, and any exertion, from which they are instinctively averse, causes a throbbing of the temples and a rush of blood to the head.

The symptoms vary in different individuals. In the more sthenic forms of plethora the pulse is full and strong, the eyes are bloated and suffused, and the countenance is flushed and hot ; the veins about the temple and forehead are distended, and the patient experiences so much discomfort and confusion in his head on any attempt at movement, that he encourages his complaint from a disinclination to exert himself. In other persons, where there is less arterial excitement, and the symptoms approach an asthenic type, the pulse is small and hard ; and in some it is weak and scarcely dis-

* "Plethoric persons are not more prone to inflammation than are those of weaker constitution ; but they are liable to congestion, especially of the brain, and to apoplexy or other hæmorrhage."—*Carpenter's Human Physiology*, by Power, 8th Edition, p. 264.

cernible or intermittent, as when the heart is flabby and weak, or there is a tendency to the deposition of fat around the heart and in the subcutaneous areolar tissue. The right ventricle is habitually too full, and the chief veins of the neck are large and prominent. Dyspnœa on exertion, and a stifling cough with pulmonary congestion, are also common in these subjects. I have met with persons of this constitution who pass urine at one time of low specific gravity, sometimes excessive, and at others containing a copious deposit of pink lithates and cayenne-pepper crystals of uric acid. They eat and drink immoderately, and fall into a heavy sleep after meals. The bowels are not always costive, but sometimes loose and relaxed, and continue so without any diminution of headache. In some persons the extremities are cold, and the face has a more dusky hue, from the plethora being of a less active character. The headache is heavy and throbbing, chiefly across the forehead or the occiput, where the blood accumulates in the occipital lobes. This form of headache may precede congestion of the brain, or even effusion and apoplexy, for the whole capillary system is too full. In milder cases there is dizziness and confusion of ideas, with a mist before the eyes; and any excitement or exertion causes a rush of blood to the head, and heaviness of breathing, with oppression about the præcordia, or laboured action of the heart. If a smart attack of diarrhœa supervene, the pain is

partially relieved ;* but free hæmorrhage from the nose or bowels will cause it to depart, even after a steady continuance of some weeks.

These headaches are common in women, and are severe at the catamenial periods, when the secretion is suppressed, or during pregnancy ; they are not always persistent, but occasional, and are excited by irritability of the digestive organs and deficiency in the powers of assimilation. When the latter condition exists, the fulness of habit is not so marked, and the venous system is not so loaded ; the circulation is more active, and the arteries are less disposed to relaxation, while the blood accumulates in the capillary vessels.

Treatment.—Nature endeavours to promote a cure by the occurrence of hæmorrhage from the bowels, nose, or uterus, and we must act upon this hint if we would effectually relieve the headache. I knew a young man residing in the country who was periodically bled, and in this way the strain was taken off the cerebral circulation, and his symptoms relieved. Some years ago I met with a stout plethoric female, twenty-five years of age, who was about to give up her situation from this form of headache. There was a full hard pulse, and scarcely any menstrual flow, till a free blood-letting reduced the arterial tension and restored the functions of the sluggish organs. But there are many persons (particularly women) who could not bear venesection, and who, nevertheless,

are only relieved by the loss of blood from the nose or uterus. These belong to the luxurious classes, and the brain is as much in a state of passive as of active plethora; it is the accompaniment of other forms of headache, and must not be sought for alone and unmixed in all cases. Where, then, general bleeding is inadmissible, cupping at the back of the neck, or a few leeches to the anus and perineum, may be resorted to. Saline aperients, and those remedies that determine the force of the circulation to the eliminative organs, must also be employed (Form. 18-19-60-80). No relief can be obtained unless stimulating food and intoxicating drinks are given up, and the sufferers resolve to change their habits of life by early rising and regular exercise, that as much blood as possible may be diverted from the internal organs, and pulmonary and cutaneous exhalation encouraged. The sufferer, however (who is usually a *bon-vivant*), cannot endure much depletion, and demands vigilance and judgment in prescribing for him. Meat should be taken not oftener than once a day, and fish and vegetables are highly to be recommended. Many persons, from peculiarity of constitution and temperament, cannot maintain their health for any considerable time if they consume animal food oftener than once a day. Diet has a great influence on the composition of the blood, and we may so regulate it as to diminish the tendency to the formation of solid matter, and to increase the

watery constituents. Many persons are stronger and more elastic when the consumption of azotized food is small; and in cases of this class, there is no probability of cure unless they are willing to submit to a careful regimen. Plethoric persons make blood abundantly, from an innate disposition in the system to corpuscular growth, and sedentary habits and high living will encourage the predisposition.

The patient should lie on a hard bed with an elevated pillow, as the recumbent position encourages determination of blood to the head and congestion of the vessels. The meals should be light, that sleep may not afterwards ensue. Moderate and regular exercise should be taken in the open air, and the mind kept as free from disturbance as possible. The hair should be kept short. The late Dr. Henry Wright states that monks who neglect shaving their heads after having once habituated themselves to do so suffer severely from headache.*

* *Headaches: their Causes and Cure.*

CHAPTER VI.

NERVOUS HEADACHE.

Common to all Classes of Society, but more particularly to Persons of Nervous Temperament and Delicate Organization—Pathology of the Affection—Probably dependent on Anæmia and some peculiar Change in the Cerebral Tissue—Nerve Storms—High Winds—Supposed Influence of Miasmatic Poisoning—Variation in the Seat of Pain, and Mode of Commencement and Termination—Want of Sleep, and Disturbance of the Mind—Disturbance of Vision—Cases of Sir C. Wheatstone and Sir J. Herschel—Distribution and Functions of the Vaso-Motor Nerves—Cases in Illustration of Nervous Headache—Hereditary Tendencies—Peculiar Combination of Mental and Psychological Symptoms—Origin of the Pain in Nervous Headache—Effects of Nervous Headache on the Moral Disposition—Falling off of the Hair, and Pityriasis of the Scalp—Xanthelasma Palpebrarum—Importance of Rest and Quiet—Cold to the Head and Warmth to the Feet—Emetics—Bromides of Potassium and Ammonium—Caffeine—Cannabis Indica—Valerianate of Zinc—Chloride of Ammonium—Nitroglycerine—Guarana—Antipyrin—Enemata of Hydrate of Chloral—Hypodermic Injections—Alkalies—Mineral Acids—Iron—Quinine—Strychnia—Cod-Liver Oil—Ocular Headache—Hypermetropic Headache—Treatment.

THIS variety of headache is not confined to any particular class of society, but it is of most frequent occurrence in persons of nervous temperament and

delicate organization. No temperament can, however, claim exemption from it, and no habit of body is proof against it. Throughout a long life it periodically attacks those who are susceptible to it. They feel it approaching as a certainty from which there is no escape, and so placidly resign themselves to its torture. It is, to a certain extent, the headache of anæmia; and yet not entirely so, because many persons are affected with it whose blood is neither diminished nor impoverished, and whose muscular development and robust appearance indicate the soundest health. Amongst its victims it selects persons of high culture and vivid imagination; and if at the same time they are deprived of their full allowance of sleep, it all the more readily seizes upon them. When the brain is highly developed and the physical organization delicate, it is likely to occur. It is in the want of balance between the mental and physical state that a nervous headache originates; for when the circulation is energetic, and the digestive organs are in sound working order, the mind may be exerted to the utmost, without the risk of incurring it.

All investigation concerning this form of headache inclines towards a nervous origin, to a morbid change in the nervous centres; and this view cannot be readily dismissed until the discoveries of experimental physiology are proved to be inconclusive or erroneous. It is infinitely less probable that the cerebral blood supply should initiate the disturbance, whatever share

it may subsequently have in producing the pain. But clothe the arguments as we may to support this or that opinion, we are still in the infancy of knowledge concerning the causes of many diseased processes, and the evidence which now appears indubitable may be far distant from ultimate truth.

Nervous headache comes on sometimes when a patient dwells persistently on anything unpleasant, or is unable to remove his thoughts from it ; when he cannot be cheerful in repose, or see the faintest sunshine in the future. This tries the brain, and disarranges the circulation within it ; for "the fact is now generally admitted that thought exhausts the nervous substance, as surely as walking exhausts the muscles. Our physical framework is involved with thought no less decidedly than with feeling, and it is requisite, if possible, to define the terms of the alliance." *

Persons know when this form of headache is threatening, and by rest and extreme care they may sometimes ward it off altogether. Thus, at an early stage, its full force may be averted by going to bed and falling asleep ; if it threatens before the accustomed time of taking food, a moderate meal may prevent it, or a full dose of bromide of potassium. Sometimes the routine duty of the day can be got through, and the misery endured ; at other times the pain reaches such a degree of severity that there

* *Mind and Body*, by Alexander Bain, LL.D., 1873, p. 80.

is no standing up against it, and the patient is compelled to give in.

This peculiar disorder is neither permanent nor continuous, and in the interval of the seizures the patient is as well as though it had not happened. It has been very appropriately, I think, classed among the paroxysmal neuroses by Dr. Hilton Fagge,* for it comes and goes suddenly, often when least expected, and without warning. But this is the character of nervous disorders generally, as facial neuralgia, epilepsy, laryngismus stridulus, gastrodynia, angina pectoris, etc. Dr. Edward Liveing† gives them the name of "nerve storms." As we shall presently see, this type of headache is among the most hereditary of diseases. From the mode and habits of life, when the nervous system has been subjected to great strain, it may break out anew in

* 'Remarks on some of the Paroxysmal Neuroses.'—*Guy's Hospital Reports*, vol. xxi., 1876, p. 376.

† "On this theory, then, the fundamental cause of all neuroses is to be found, not in any irritation of the visceral or cutaneous periphery, nor in any disorder or irregularity of the circulation, but in a primary and often hereditary vice or morbid disposition of the nervous system itself. This consists in a tendency on the part of the nervous centres to the irregular accumulation and discharge of nerve-force—to disruptive and unco-ordinated action, in fact; and the concentration of this tendency in particular localities, or about particular foci, will mainly determine the neurosis in question. The immediate antecedent of an attack is a condition of unstable equilibrium and gradually accumulating tension in the parts of the nervous system more immediately concerned, while the paroxysm itself may be likened to a *storm*, by which this condition is dispersed, and equilibrium for the time restored."—*On Megrin and Sick Headache*, 1873, p. 336.

a single member of a family, when no other member of it suffers from any neurotic disorder. The occupation of each one's life exercises, either consciously or unconsciously, an important influence on the bodily and mental state, and each calling may have a large share in determining our susceptibilities. In some persons the headache, which I would designate as strictly nervous, begins with an affection of vision, the sight being clouded and dim on that side of the head where the pain commences (as in one temple), afterwards followed by the usual phenomena of sickness and confusion of ideas independent of any excess or diminution in the blood supply. It is traceable in some cases to exhaustion, fatigue, and losses of blood ; but more commonly to worry and anxiety : in others, no cause can be assigned—it comes and goes without any satisfactory reason, and lays the robust and square-shouldered man as prostrate as the over-drained and sickly woman. In employing the term "nerve storms," Dr. Liveing implies that there is an accumulation of nervous force which explodes in the shape of headache ; and it is certain that all who have carefully observed the phenomena leading up to an attack must have been struck with the excitement of manner and irritability which precede the outbreak. The period may vary from a few hours to many days. In some confirmed sufferers I have repeatedly witnessed a series of symptoms which have culminated in an attack, and no ease has

been obtained till the affection has worked up to its height. There is a period during which disease obtains the mastery, and all remedies are unavailing to keep it in check. If the general health is reduced, the attacks are more frequent, and recur with no precise regularity; but when the health is stronger, the intervals are also greater. Worry is a common exciting cause in both men and women, especially if they are sensitive and given up to society and excitement. A mind ill at ease becomes exalted or depressed, and the cerebral circulation being unsteady deranges the nervous structure. Overwork of the brain is another cause in those persons who live in towns and large cities, and pursue sedentary occupations.

A single lady, thirty-one years of age, sent to me by Dr. Collier, of Southport, in December, 1885, suffered from nervous headache, induced by high winds coming from any quarter. She first experienced a dull, heavy sensation in the head, which seemed over-filled, followed by pain in the back of the eyes, and a feeling as if they were being drawn into the head. The pain then extended to the occiput, and down the spine. There was sometimes pain at the top of the head, but not across the forehead, or in either temporal region. If the extremities became hot she was relieved. This peculiar sensation, only experienced in windy weather, is probably owing in this case to congestion of the cerebral vessels. The facial nerve feels

the shock of cold, and dilatation of the vessels near its origin ensues. The vaso-motor centre is disturbed by cold, and hence the variation in blood pressure. After the headache there is a feeling of a running cold in the head. The patient is free in summer, but bad in autumn and winter. The headache will sometimes last continuously for five or six weeks.

When the paroxysms recur with regularity, miasmatic poisoning requires to be taken into consideration ; but I must say that this cause has rarely suggested itself to my belief, for nervous headache is more common to residents in large and populous towns, where marsh poison does not prevail, whilst it is questionable whether the disease is especially frequent in malarial districts.

When a nervous headache, having all the characters of true migraine, follows certain articles of diet, as pork, butter, fatty articles of food, and alcohol, it is beyond doubt that these have had a large share in provoking the mischief. We are repeatedly told by patients that, unless they observe the greatest care, they will suffer the penalty of a headache for indiscretion.

The pain most usually attacks the forehead and vertex, but sometimes the occiput and back of the neck. After it has lasted some time, it not unfrequently seizes upon one temple, or one eye, or one half of the head, and thus resembles the headache of neuralgia. A married lady, *æt.* 30, consulted me in

May, 1876, for a nervous headache, to which she had long been subject. It began over the forehead, and in the course of an hour or two would seize on the left eye, where it would continue for a whole day, and then leave her after a night's rest. The feeling she described to be as though something was forcing out the left eye, the tears running over the cheek so plentifully that it became inflamed and sore, while the pain extended down the left side of the nose; also light and sound became intolerable to her. The patient stated that through life she had been subject at times to "*bilious attacks*," and, though still she often would feel nausea, she never actually vomited. With this condition of the brain the hands and feet were always cold, and, if the pain had continued long, the head grew hot, as if full of blood, and the face became flushed. However severe the suffering, she could always eat her dinner, which sometimes relieved the pain, and at other times increased it. When the pain was coming on, she told me that she was always inclined to cry at the slightest thing.

The approach of headache in some persons may be foretold by the sluggish action of the bowels, a loathing of food, together with flatulency and eructation. In the same class of persons, at other times, I have known a state of chilliness and a very scanty and turbid secretion of urine to precede the headache; while with other persons, the passing of a large quantity of limpid urine may be the forerunner of an

attack. I know a lady, fifty years of age, who, for a day or two before the seizure, is troubled with a copious secretion of saliva which runs from her mouth ; another lady, of about the same age, has a hard dry cough, and she invariably passes a large quantity of limpid urine prior to the outbreak. In others, again, there is extreme irritability and disquietude ; the patient cannot keep quiet for an instant, and no efforts avail to calm or appease her : all things are wrong—nothing goes right. The pupils are contracted, the eyes sunken, the extremities cold, and the pulse is feeble. Then succeeds a period of calm and surrender, and the patient is completely exhausted and overcome. This headache is most frequent among women who are approaching the middle period of life, and who are exhausted by the strain of maternal duties. If they have borne children rapidly, and the uterine functions are active, then it is of common occurrence. Over-suckling, menorrhagia, and profuse leucorrhœa are also causes ; dysmenorrhœa, and even ordinary menstruation, will bring it on in some persons. As regards menstruation as an exciting cause, the quantity of loss affords no explanation, for nervous headache is as common where the catamenia are deficient, as where they are in excess. The ovarian irritation which prevails at these periods, induces a painful condition of the cerebral nerves through sympathetic action ; and there are women who invariably suffer in this way at every menstrual period, when the quantity

of loss cannot explain the occurrence of the pain. The real disorder is in the membranes or nerve fibres of the brain, which become deranged from distant sources of irritation acting through the sympathetic system.*

Constipation is sometimes held to be a cause of nervous headache, when, in reality, it is far more frequently an effect. If, when the attack comes on, the bowels happen to be costive, the pain in the head is increased from the greater sympathetic action; but if they happen to be relaxed, the pain is the same, and mere looseness of the bowels does not relieve it. Those who are subject to this form of headache, although they may have escaped it for many years of their life, are persons whose constitution is originally weak. I have known persons to reach the age of thirty-five before getting an attack, and then, circumstances having arisen to lower the standard of health, the consequent excessive waste of nervous matter has rendered them liable to the complaint. The hard-worked physician, the laborious scholar, the anxious merchant, who toil hard and late, and neglect the ordinary precautions of health; the corrupted youth, who has sacrificed himself to vicious habits; the anæmic girl, and the half-starved seamstress—all are victims to this terrible form of headache. Those who dwell in the fashionable world, and keep late hours, are particularly subject to it; for hot rooms, evening

* See Chapter III., on Sympathetic Headache.

parties, and imperfect ventilation are always likely to produce it.

But, in addition to the activity of mind and the emotional sensibility which are common to the sufferers of nervous headache, there is a state of the bodily constitution which renders people liable to it. In a lowered condition of the general health almost any cause will induce an attack. Prolonged study, the mind being kept bent on the accomplishment of a task in a given time, pondering over figures that require much mathematical calculation, the jarring of vehicles over bad roads, the alarm and timidity at driving along crowded thoroughfares, and disagreeable odours of all kinds, will be sufficient to invite it in some cases. All forms of peripheral irritation of the senses of sight and hearing excite increased central irritation, especially in cases of meningeal mischief; consequently we find that darkened rooms and absolute silence are excellent palliative measures. Moreover, depraved secretions in the alimentary canal, or any morbid impression on the gastric nerves, will bring it on.

Difficult as it is to fix upon exciting causes, we can hardly escape the conviction that derangement in the chylopoetic viscera has an important bearing in the causation of the malady. The interruption to the process of digestion caused by travelling on a full stomach invariably brings on a headache with some persons. I have met with several cases, and one

in particular, where a gentleman always suffers from headache if he goes a journey shortly after taking food. There are persons of similar nervous organization, who experience a sharp attack of diarrhœa at the prospect of travelling by rail, or going a sea voyage.

Disturbance in the electrical states of the atmosphere, and variations in the barometric pressure, will excite an attack of nervous headache in some persons. By these persons the approach of a thunderstorm can be calculated with an absolute certainty from the feeling of weight over the forehead and a severe headache. Long before thunder is heard, or the patient has any conception that a storm is coming on, he is heavy and oppressed, or restless and timid; there is a weight across the forehead, and he is unable to exert himself in mind or body. If he attempts to read, his temples beat and his forehead aches, his face flushes, and his last meal has probably caused flatulence, and a sense of heat and dryness in the mouth. Abstinence from food and continuous effort may keep the pain in abeyance; but still it clings to him more or less, and he gets through the day's work miserably enough.

As regards disturbances of vision, many of the patients who have complained to me of this symptom have described a painful sensation on attempting to read or look at objects, and a misty or clouded appearance before the eyes; of flashes of light and dazzling sparks in the field of vision. One female

patient assured me that a dim and clouded appearance before the left eye announced the commencement of the attack for some hours before the head began to ache. Sir C. Wheatstone, Sir John Herschel, and other eminent men describe their own experience of it; and for another interesting account I would refer to the *Philosophical Transactions* for 1870, 'On a Distinct Form of Transient Hemiopsia,' by Dr. Airy. Sir J. Herschel describes a singular shadowy appearance at the outside corner of the field of vision in the left eye, coming on when he was doing nothing and thinking of nothing. It gradually assumed the drawing of a fortification, with angles, bastions, and ravelins, and faint lines of colour between the dark lines, and the impression was the same, whether the eyes were closed or open. It lasted a minute or two, and spread over the whole visual area, and was not followed by headache, as it was in another case. The account given by Dr. Airy of the phenomena is very interesting, and will repay careful consideration. "Another very important point about these attacks is, that in perhaps from one-fourth to one-third of the cases, during this glimmering stage, there is tingling in some portion of the body—the part is *asleep*. In a young female that I saw, the tingling affected one arm and the side of the tongue; and, curiously enough, both her sister and her father were affected in precisely the same way. The tingling was on the *same side* as that on which the glimmering in the

eye began. In another case, the patient complained of a feeling of pricking and scratching on that side of the face corresponding with the glimmering. In others, speech or hearing may be affected."* The persons who suffer from ocular disturbance are, in my experience, most frequently women of nervous temperament, who have active brains, and are energetic and restless.† They are often anæmic and subject to chronic debility. Fatigue of all kinds and over-excitement will lead to it, as well as the drain of leucorrhœa or menorrhagia, which exhausts the system and lowers the bodily tone. Under "Sympathetic Headache" I have described how this state is brought about, and I may here mention that the vaso-motor branches of the sympathetic nerve regulate the contraction and dilatation of the blood vessels of the brain; and we have seen that when the cervical sympathetic was divided, there was an afflux of blood and a dilatation of the vessels. When the vessels of the brain are contracted, the supply of blood is diminished; when they are dilated, the quantity is increased, and this is an explanation of the headache that results after the stage of excitement has passed, when the systemic circulation is heightened and increased.‡

* Dr. Latham, *On Nervous or Sick Headache*, p. 10.

† See the remarks on Ocular Headache, at the end of this chapter.

‡ "That there is a vaso-motor centre, and that it is intra-cranial, we learn by observing, first, that if the medulla is divided immediately below the cerebellum, all the arteries are relaxed, and that a similar

The following case is one carefully studied, and may be regarded as a type of nervous headache. Each attack seemed to divide itself into two distinct periods—*firstly*, the stage of irritation, where the brain is first at fault, and the stomach secondarily affected; *secondly*, the neuralgic stage. This will be best explained by the sufferer's own account, as communicated to me from time to time :—

A. B., æt. 49, began to suffer from severe headache in 1867, being then the mother of four children, which she had had in rapid succession, besides two premature births, all in the course of seven years. After this she had great and frequent catamenial losses, which compelled her to keep her bed, or to remain in a recumbent posture for days together. The headaches generally came on the third day of

effect is produced, if certain afferent nerve fibres which lead to the intra-cranial part of the cord, are excited. Its position has been lately determined with great precision in the rabbit by Ludwig and Owsjannikow, who have found, by experiments, that it is limited towards the spinal cord by a line four or five millimetres above the *calamus scriptorius*, and extends towards the brain to within a millimetre of the *corpora quadrigemina*.

“That the vaso-motor centre is in constant automatic action, is shown by the paralyzing effect of section, whether of the spinal cord, or of any nerve known to contain vascular fibres. If the action of the centre were not constant, division could not produce arterial relaxation. In relation to this constancy of action, the word *tonus* is used. Arterial tonus means that degree of contraction of an artery which is constant and normal. It is maintained only so long as the artery is in communication with the vaso-motor centre.”—*Handbook for the Physiological Laboratory*, ‘Functions of Vaso-motor Nerves,’ by Dr. Burdon-Sander-son (Text 1873), p. 235.

the loss, though occasionally at other times ; and then they were always traceable to fatigue or worry. At the onset of each attack she complained of violent pain on the top of her head (which always became very hot), extending over the occiput to the neck. The eyes were sunken in the orbits, and the pupils were small and contracted, and there was a feeling as though they were being pulled back into the head ; light and sound were intolerable ; the feet and hands cold ; the pulse was slow and feeble, sometimes not exceeding fifty beats in a minute. The bowels refused to respond to medicine. Sometimes she obtained partial relief from ice to her head ; while at other times she could not lie still, but kept pacing up and down the room, with her mind much disquieted, and a wish to die. When the suffering was acute, the patient could not rest her head on the pillow, nor could she open her eyes or engage in conversation. She was continually tossing and turning from one position to another, while her mind indulged in the most melancholy forebodings, and renewed the fancied grievances of a lifetime. She could not escape from the toils of calculation ; her mind kept running in a narrow groove, and all things appeared distorted. This stage would last as long as thirty-six hours, being sometimes accompanied by sickness, and sometimes not ; but no food could be borne, and her sleep, which was broken, seldom brought any relief, for she continually awoke groaning with pain. Very

gradually, however, a change in the character of the headache invariably ensued; acute neuralgic pain, coming and going over one or both eyebrows, would set in, and occupy the place of the other, which now slowly decreased. From this moment she was able to take plenty of soup, champagne, and quinine.

This case baffled all attempts at relief till the hypodermic injection of morphia was tried; and then, after days of maddening pain, the patient would turn round at once and sleep tranquilly for twenty-four hours. She awoke with the neuralgic period to ensue, but fortified to bear it, and after a few days' weakness and exhaustion, during which the eyes retained the drawn-back feeling, she regained her usual health.

NOTE.—*Feb.*, 1877. During the last six months the patient has suffered less from the variety of headache she formerly complained of, but her general health has sensibly declined, and she is fatigued after the slightest mental or physical exertion; the noise of the street, the sound of music, or the excitement of ordinary conversation are all too much for her, and she has the manner and appearance of a confirmed invalid. Her blood shows indications of great impoverishment and anæmia, as evidenced by an irritable and red eruption on the nose and face, troublesome pityriasis of the scalp, and purple patches of ecchymosis at the inner angles of the upper eyelids, which are always increased during and just after a seizure of headache. When the eruption began to subside she complained

of pain in and about her eyes, of a very distressing character: she could not bear the light, and to move the eyes (especially the left), either outwards or inwards, caused acute suffering. There was also frequent neuralgia of the right and left brow, and she had great difficulty in reading, her sight seeming to go for a time when she made the effort, the letters appearing clouded and misshapen. The light was so trying to the eyes that she always preferred a darkened room, and when able to venture out of doors she wore blue spectacles with advantage. There was no optic neuritis. Six months' absence from home life and staying at different quiet places where the air was pure, and getting plenty of rest, restored her general health in a remarkable manner, and enabled her digestive powers to assimilate iron and arsenic (Form. 24 *b*) and a glass of port wine at her midday meal. She was also able to take brandy-and-egg mixture, and a full dose of quinine when an attack of hemicrania was threatening. Bromide of potassium at night, and aconitina ointment (Form. 112-113) applied over the brow, often cut short the paroxysm, and procured sleep. Moderate exercise, short of fatigue, was of advantage, but the least worry or anxiety invariably threw her back for several days. All chance of success depended upon the power to improve the quality of the blood, and to remove the anæmia of the tissues.

NOTE.—*Oct.*, 1877. On returning to home duties a severe paroxysm came on, and after three days of

increasing agony and confinement to bed without a moment's respite from pain, she suddenly became collapsed, and pulseless, with cold extremities, and her condition for a few minutes was very alarming. She was unable to swallow for some time, till external warmth and friction had restored her faltering circulation, and then the effort was accomplished with the greatest difficulty, owing to a sense of suffocation which the attempt excited. From this time "the nerve storm" abated in severity, leaving the patient very prostrate, but free from pain.

NOTE.—*April*, 1879. Since the above report the patient's general state of health has improved, but the headaches have assumed a more neuralgic type, the pain seizing the right or left temple, or both temples, and finally settling into what she describes as "the back of the eyeballs." It is of so severe a character that she cannot bear the light, or even lie still for many minutes together. There is generally coldness of the extremities, shivering, pallor, small contracted pulse, and a sense of indescribable misery and exhaustion. A full dose of quinine (five grains, with a few drops of spirit of chloroform and water), followed soon afterwards by a glass of champagne, or brandy in soda water, has sometimes been found to shorten the attack, if given early enough; but more often the suffering has been prolonged over two days, notwithstanding that the quinine has been repeated every two or three hours, with various kinds of

nourishment given in the intervals. The pain is traceable to indigestion, worry of mind, fatigue, excitement, and especially cold winds.

NOTE.—*Feb.*, 1888. During the last three years the headaches have become less severe and frequent ; three or four attacks being the most she gets in the course of twelve months, and these seldom require the hypodermic injection of morphia. The pain begins at the top of the head, oppressive and penetrating ; the patient will walk the room, to and fro, for hours, with the fingers of both hands interlaced and the palms resting on the vertex of the skull. Some of the paroxysms are so acute that she cannot avoid screaming out. There is nausea, or vomiting, and a loathing of food, free secretion of pale urine, sluggish action of the bowels, and coldness of the extremities. Another point is the expression of the face, and in this, as in many other diseases, it is almost characteristic ; it indicates great suffering and exhaustion. The features are worn and pinched, the forehead is furrowed between the eyebrows ; the pupils are contracted, and the eyes lustreless and despairing. The mouth is drawn down at its angles, and half open, whilst saliva is often wiped from it. The restlessness is extreme. A copious draught of warm water will empty the stomach of a quantity of acid ropy mucus, and sometimes cut short the paroxysm, but it is generally necessary to take a dose or two of hydrate of chloral, and if this remains on the stomach and

induces sleep, she wakes up better. Some of these headaches are now abortive, so to speak; they threaten, or they are mild and cut short by appropriate treatment, whereas formerly no plan that could be thought of would prevent the full explosion of the headache storm. Be this as it may, one-sided headache always follows the attack just described, some paroxysms being very severe and protracted. For this condition brandy, champagne, quinine, and beef-tea are required. The most absolute rest and quietude are enjoined, and several days elapse before the patient recovers her usual strength.

C. D., æt. 40, m.: three children, one miscarriage, active and energetic temperament. When she first consulted me in November, 1874, she had been complaining of headaches for five months previously. Any exertion would bring these headaches on, and they generally came either after, or during, the flow of the catamenia; especially if she took extra exertion, or was in any way excited. The patient had suffered from neuralgia of the face for many years, but these attacks seldom recurred now. When these headaches were coming on, small things would worry and annoy her; she could not sleep, but would light a candle and read. They did not occur suddenly, but the patient was aware of their approach, and could ward them off altogether by rest and quiet. The bowels were always inclined to act too freely, and before marriage there had been great dysmenorrhœa. First,

a general sense of discomfort and confusion in the head was felt, trifles assuming undue importance, one idea running persistently in her head, while the patient lost all sense of proportion.* If the pain increased, it became localized in the temples and the top of the head, and there was a feeling as if something were being driven into them. "It seems, however," said the patient, "as if my spine must be in some degree affected, for I am obliged to lie with my chin raised, so as to rest the back of my neck." The intense pain varied considerably in duration—from about six hours to twenty-four. When the headache abated, sleep generally ensued for a considerable number of hours; and, on waking, the pain was gone, though the head was sore and weak. If the attack was very acute, five or six days would elapse before she recovered her

* All states of nervous exhaustion, whether brought on by inordinate indulgence in drink, or by the ordinary avocations of life, are capable of giving rise to subjective sensations of the strangest character. They may be described as hallucinations—phantoms of the unreal and imaginary. I have met with some sufferers from headache who, in their suspended moments of agony, have told me that they had no power to give the aching brain rest. As the pain lulled, the functions of the brain became unduly active, and the mind busy with the miraculous; tortured with the fear of death, or the dread of committing suicide. Emotional excitement, and real or imaginary wrongs, will take possession of the sufferer, and he can no more command himself and shake off the supernatural belief, than he can bid the throbbing brain be still. This is the outcome partly of a disturbed circulation, causing, it may be, some arrest or interference with the passage of the blood through the vessels which supply the brain and nourish its delicate tissue, and still more of an irritable and exhausted state of the cerebral cells. Exhaustion in nerve matter is the forerunner of irritability.

usual strength. Formerly, when the headaches were very severe, she had slept badly for six months; now she had quite recovered her sleep, except just before an attack of headache. The patient writes (April, 1876) that she followed medical advice for six months. In addition to the headache, when she first consulted me, there was great uterine loss and relaxation of the bowels. Both these functions are right now, but if she happens to get a return of the one, she also has a return of the other. The headaches are far less frequent than they were eighteen months ago, and as a rule much less severe. At the time of consultation (November, 1874), the pulse was weak, and only sixty beats per minute; the tongue was clean, the eyes were energetic, but her looks showed exhaustion. The treatment consisted in all possible rest, mental and physical, particularly at the menstrual periods. A preparation of iron (Form. 39) was to be taken twice a day after food, and bromide of potassium at night (Form. 40). A month later all the symptoms of relaxation had improved, and bromide of ammonium was substituted for the previous medicines (Form. 25). At the close of December, 1874, the bowels were more regular, and there was less headache and irritability; the pulse was firmer, and the beats were seventy-two per minute.

It may be interesting to note that the mother of these two patients, who were sisters, suffered in the same way, and that she was for years under the late

Dr. Todd. She suffered from extreme meningeal irritation, and remained in bed for days together in a darkened room, unable to eat a morsel of food or to retain a drop of anything on her stomach. During a period of twenty years, whilst these headaches lasted, fears were entertained that she would lose her intellect. After the age of sixty she ceased to suffer from them, and in 1876 was not only entirely free, but her activity and powers of endurance may well have been envied by persons half her age.

The following is another example of nervous headache; and it presents an assemblage of symptoms, which prove unsteadiness in the brain centre, and a hyperæmic state of the cerebral vessels from partial paralysis and dilatation. It is a matter of no great importance whether the cause is attributable to over-indulgence in spirituous liquors, or to excessive mental activity. The consequences and the train of symptoms are much the same in both instances. And I must here insist on the fact that the true congestive headache has features in common with the nervous form in some stage or degree of the attack. F. H. B., æt. 31, married, first consulted me on December 5, 1873, for headache, to which he had been subject since 1860. He was tall, slender, pale, and dark, and led a life full of intellectual activity, exerting his physical and mental strength to the utmost, and seldom taking that allowance of rest which is essential to the enjoyment of moderate health. Eighteen years

previously he had scarlet fever, succeeded by congestion of the kidneys and dropsy. At this time he had agonizing headache, leading to effusion of the brain and insensibility. There is little doubt that these symptoms were due to the retention of urea in the blood. When he recovered from this illness he suffered from irritative dyspepsia, which lasted for a year or two. The attack of headache in question came on from dining in the middle of the day, and walking afterwards. The pain grew worse and worse, and at length he became sleepy and retired to bed, when he seemed a little better. He awoke at 10 p.m. with a kind of muddling pain, and a dreadful feeling as though his head was filled with lead, and then followed a sensation of stuffiness and throbbing. Sometimes there was a pain as if the head was opening and shutting. The headache began in one or the other temple (formerly in the left temple); it passed through to the occiput, and extended down the cervical vertebræ, rendering the muscles of the neck stiff and painful to move from a fixed position. The headaches were sometimes attended with nausea, and sometimes preceded by dizziness. They usually came on in the morning, with a dull oppressive weight and pain; but this time he was attacked later in the day, and, as the pain grew bad, he became cold and shivering. The urine was clear and free from albumen, the bowels regular, the tongue slightly coated; the pulse 72, small, weak, and regular. The heart

was healthy, and free from any organic or functional bruit. The psychological symptoms were peculiar. He would feel he ought to do a particular thing, but could not bring his mind to do it; he was playing at cross purposes and contending between reason and obstinacy. He would not allow his wife, whom he loved, to come near him; but he would allow the nurse, whom he hated. He was irritable, and knew intuitively which of three remedies would abate the headache; but unless his attendants could find out for themselves which it was, he was so perverse that he would not tell them; and if they brought the wrong one, he was frantic and uncontrollable. In this respect he resembled his child, who also suffered from a similar form of headache. When he was overtaken with these headaches he could not keep still or lie down, but was perpetually walking about. As to remedies, an emetic was one of the most speedy and effectual; but the quickest remedy of all was a mustard poultice applied to the back of the neck, the feet being immersed in warm water. This sent him soundly to sleep in half an hour. The day after the headache was simply one of dulness and inactivity, and if he exerted himself it would return.

I ascertained in May, 1876, that this patient's headaches were less acute, less frequent, and less inevitable than formerly, and that there was less perversity and violence of manner. A dull heavy feeling frequently threatens, but gives way to rest or treatment. Hot

water to the feet, and rest, are still the two chief remedies he relies upon. He still uses a mustard poultice to the neck when the pain is very bad, but this now very rarely happens. Brandy never gives the slightest relief; and music, which at one time seemed to arrest the headaches magically, has no effect at all now.

February, 1888. The headaches have become much less frequent and severe.

The following is an example of nervous headache of the severe type, not promising great benefit from treatment unless the occupation and habits of life can be entirely changed.

S. B. T., æt. 43, m., consulted me May 31, 1877. Has served twenty-seven years as an officer in the Indian army, and during this time experienced good health except on two occasions. The patient was thin and spare, of energetic habits, and nervous temperament.

In 1857 he had severe malarious fever, which compelled him to return to England for eighteen months.

In 1867-8 he held a responsible and anxious post during the Abyssinian war; the strain of mind and body was so great, that at the end of the expedition he was compelled to return to England, when he suffered chiefly from sleeplessness and disinclination for mental work. Two years' residence in this country completely set him up, and he returned to India in July, 1870, quite recovered.

In 1872 he was subjected to severe mental distress, and about this time *continuous* (as distinct from *occasional*) headaches commenced, and from these he is still suffering.

He thus writes: "I appear to suffer from two distinct headaches: the one occurs only at distant intervals, varying from one to three months; the other is *continuous*. The *occasional* headache gives some notice of its approach, feeling out of sorts for a day or two previously. It commences soon after awaking in the morning, and increases in intensity during the day: the pain is distracting, head hot, with sense of fulness, extremities cold, and nervous twitching. Cannot bear a reclining position for a moment, but compelled to keep constantly walking up and down, till sometimes ready to drop from fatigue; when pain moderates sufficiently to make sleep possible, still obliged to avoid a recumbent posture, and get my first sleep either in a chair, or propped up with pillows in bed. These attacks leave no trace behind, except a little shakiness next day. A strong saline draught sometimes shortens their duration, and in unusually severe attacks, an ice-bag to the head, and occasionally (though seldom) I inhale a little chloroform to deaden pain, but not sufficient to cause insensibility.

"The *continuous* headache first commenced about five years ago, shortly after the mental strain in 1872. At first, symptoms slight; would wake in the morning

feeling unrefreshed, and with a most uncomfortable sense of giddiness and weight in the head : this would generally go off at ten or eleven o'clock."

" But by degrees the periods of freedom from discomfort became shorter ; there was difficulty in getting sleep ; would constantly go to rest and sleep well for an hour or so, and then awake and be unable to sleep for several hours, generally getting up and reading in the intervals. There was great disinclination for mental work, and a putting off from day to day of business or duties, which, when circumstances compelled to be taken in hand, were transacted on the spur of the moment with satisfaction."

As he continued in this state for four years, not growing better, but on the whole worse, he was obliged to return to England—in May, 1876.

He has derived no benefit at present from being in England, as he suffers continually from this headache.

The symptoms are so variable that it is difficult to describe them with precision. As a rule, there is a dull heavy pain in the head, accompanied with giddiness and with throbbing, which is sometimes so intense that the beats are distinctly felt in both ears, whilst at other times the pain is slight, and less of a throb than a sort of undulating pulsation.

There is often pain immediately over the eyebrows, great soreness of the eyes, and unwillingness to face the light. The headache is sometimes in the brow, when it is generally accompanied with heat of surface ;

at other times it is confined to one spot (about the size of the palm of the hand) in the centre of the top of the head, and at others it is over the occiput and nape of the neck.

Again he writes: "When very bad, every noise seems to go through the brain; the sound of talking in the room is so unbearable that I am compelled to go away and remain in a room by myself. Occasionally there is very great irritability, and a sort of weary restlessness, inducing a constant desire to travel about from place to place. There is unwillingness to exert the mind in any way; reading is taken up as a distraction, and as the memory is affected the subject is speedily forgotten. Notwithstanding disinclination for exertion, the want of regular occupation (to which I have been long accustomed) is severely felt, and has, I think, done more to prevent improvement than anything else.

"For the first eight months after returning from India, sleep was most irregular; night after night lying awake till two or three in the morning; but during the past few months there has been an improvement in this respect, and a broken night's rest is the exception, and any feeling of wakefulness yields to tincture of cannabis indica in twenty-minim doses, leaving no unpleasant effects next day.

"My appetite is better than on my first return from India: digestion good. I am temperate, but smoke freely, and the inclination is greatest when

irritable. For the last four months the headaches seem to increase in intensity at regular intervals of from fourteen to sixteen days, and sometimes there is a feeling of weakness and pain in the limbs. On returning from India I was examined, and the *spleen* was found to be tender on pressure, but the *liver* was free from disease. Took podophyllin, hydrochloric acid, and taraxacum ; later on, took bromide of potassium three times a day for a month without benefit ; neither the sleeplessness nor headache had diminished. Then a blister was applied to the neck, and arsenic taken, without benefit ; after this, strychnine failed. Recently quinine in gr.v. doses was prescribed, and failed, and gr.x. doses gave no relief.

“The *headaches* are not hereditary in our family, and my brother is singularly free from them, being able to say that he has never had a headache in his life.”

He has been constantly moving about to Scotland, to Wales, Folkestone, and Cornwall, without deriving benefit. Cannot ascertain what causes the headaches ; they appear to become more intense, and to moderate without special cause : no medicine has any effect.

May 31. (His first visit.) Had intense weight this morning over head ; giddiness up to ten a.m., which has left only the feeling of weight : the pain moves about from one part of the head to another.

Tongue bluish and furred ; pulse 64, pretty good and regular ; urine pale straw colour, acid, sp. gr. 1020, and non-albuminous ; liver healthy ; heart weak.

N.B.—The great feature of this case is nervous exhaustion, and a most languid circulation. Arsenic, iron, and calumba were prescribed twice a day (Form. 24 *b*), and bromide of ammonium on rising in the morning (Form. 25). The diet was ordered to be plain and simple, stimulants to be avoided, and no tea.

June 19. He writes : “ I think that, on the whole, I can fairly say that I am better : the periodical attack is somewhat less severe, and I have not suffered quite so much either from giddiness or headaches ; but the sense of heaviness and dulness still remain constant.”

To continue cod-liver oil, or malt extract, and Carlowitz or claret.

From his account he had evidently taken too much exertion, and fatigued himself.

September 30. Benefited and improved for two months in Wales, but when out in the garden one day picking strawberries, the sun was powerful, and beating fiercely down his back whilst stooping. In the afternoon one of his severe headaches came on, and he has never been well since. The weather after this was damp and depressing for six weeks : he felt weak and depressed ; the chief new symptom was aching pain in the small of the back, which he has

never lost. Frequently he felt feverish, and on one occasion, soon after the "sunning," had a distinct but mild attack of ague. Giving up smoking did no good; the pain in the back gives more uneasiness than the headache itself. As he was obliged to return to India, he was advised to avoid the heat of the sun, and as much as possible to live quietly. A simple plaster was ordered to the back, and hydrobromic acid and quinine twice a day (Form. 14).

The origin of the pain of migraine is supposed by some authorities to reside in the optic thalami, and the visual defects to originate in the organ of the affected side, and then to extend downwards in the course of the sensory tract. I must refer the reader to the different opinions held by Dr. Broadbent, Dr. Ferrier, Dr. Bastian, and Sir Crichton Browne.* The latter writer, in speaking of the blood supply to the great ganglia of the corpus striatum and thalamus

* Sir Crichton Browne's paper 'On the Functions of the Thalami Optici.'—*The West Riding Lunatic Asylum Medical Reports*, vol. v., 1875, p. 129.

"According to M. Hervez, of Chégoïn, migraine is an arterial neurosis which takes its origin in the great sympathetic nerve, and its seat is in the nervous filaments which accompany the arteries, whilst it manifests itself in the dilatation of these vessels, and in the compression of the brain and other organs it produces. The treatment of migraine consists in combating the tendency to periodicity, the pain and the arterial dilatation. M. Hervez finds the following prescription of essential value in fulfilling those indications. He gives every day one pill containing about one grain of sulphate of quinine, one grain of tannic acid, and a seventy-fifth of a grain of aconitina. The dose may easily be increased to three or four such pills daily." (*Journal de Médecine*, December, 1876.)—Quoted from *The Practitioner*, March, 1877, p. 197.

opticus, thus writes: "But the middle cerebral, the chief artery of the corpus striatum, is distributed to the motor regions of the cerebrum, while the posterior cerebral, the chief artery of the optic thalamus, is distributed mostly to the sensory regions of the cerebrum. These facts surely suggest the intimate association of the corpus striatum with motor, and of the optic thalamus with sensory functions."

In some few instances I have known the hair to fall off from continued nervous headache, and when this happens the scalp may become the seat of great irritation, with troublesome pityriasis. Both Cazenave and Neligan have observed the same.* Two cases are in my recollection where the scalp became the seat of so much irritation that the patients could not summon up sufficient fortitude to resist scratching their heads incessantly. The itching, tingling, and the abundant desquamation of white brownish scales, are invariably increased after each paroxysm of headache. I have so often noticed the co-existence of dandruff with imbricated scales in those who have suffered from confirmed nervous headache, that it must be more than accidental. It is a constitutional affection, in which the nervous system is largely con-

* Neligan, *On Diseases of the Skin*, 1852, p. 250. The late Dr. Anstie after each attack went grey over the temple which was subject to neuralgia. A single lady, thirty years of age, who came under my care some years ago for severe neuralgic headache on the left side of the head, had her eyebrows and eyelashes become permanently white from repeated attacks.

cerned, and the most frequent cases in my experience have been in women about the middle period of life, who have suffered from catamenial disturbance. It is not improbable that a local irritation may be induced through the branches of the fifth nerve, as they ramify over the scalp, and so lead to an excessive secretion from the sebaceous glands. When the greasy scales so formed are allowed to remain, they become dry and brown, and in some few cases the scalp underneath is tender and reddened. But it is important to distinguish the disease from eczema, which may generally be done without difficulty; true pityriasis being characterized by an absence of exudation and albuminous secretion. A weak ointment of nitric oxide of mercury is an excellent application (Form. 114 a).

Another curious affection of the skin is sometimes observable in women about the middle period of life, who are great sufferers from nervous and neuralgic headache—patients who have endured severe pain for years, and who are much exhausted in consequence. Their dark shrivelled eyelids and blank expression of the face attest the fact beyond doubt. The complaint to which I allude is known as *Xanthelasma Palpebrarum*. Sir Erasmus Wilson says the affection is owing to an hypertrophy and altered colour of the epithelium of the sebaceous gland and of its excretory tubuli.* It is a new growth of connective

* *Diseases of the Skin*, 1863, p. 619.

tissue infiltrated with an oily material which imparts to the discoloured integument the buff or yellow colour. The disease consists in defined patches of discoloured skin, of irregular outline, occupying the upper and lower eyelids, at the inner canthus. They are variable in colour, sometimes being of an orange or lemon tint, but that of chamois leather, or nankeen, is a good resemblance. They are smooth and soft, and look like caseous matter immediately beneath the skin. The patches are not attended with pain or irritation, and they never ulcerate nor suppurate. They are generally looked upon as permanent and incurable, but Sir Erasmus Wilson says he succeeded in removing the disorder in one patient by the application of compound tincture of iodine, and by the internal exhibition of arsenic.*

Mr. Jonathan Hutchinson has recorded a rare example of *Xanthelasma* in which the affection was limited to the lower eyelids, which is extremely rare. The patient was a lady, forty-two years of age, who had suffered much from neuralgia, migraine attacks, with *temporary amyblyopia*, and pins and needles in her left arm.†

Treatment.—Here a task of exceeding difficulty lies before any writer, and no amount of experience enables him to lay down any uniform plan for adoption and guidance. Every case must be treated on its

* Op. cit., 1863, p. 620.

† *Brit. Med. Jour.*, 1887, p. 985.

own merits—absolute and binding rules are useless. A method of treatment which has answered our expectations in one case is futile and barren of results in the next ; the misery pursues a determined progress till the attack is over. Practically, then, the patient resigns himself to his fate, till the nerve storm has worn itself out by excessive expenditure, and sleep has readjusted the circulation within the head. If we can induce the patient to alter the habits of his life, we may hold out the prospect of arresting the frequency of these headaches ; and, moreover, we shall bestow some ease and comfort, if we can fortify the general health to resist them, till increasing years, and physiological changes in the different organs of the body, render the patient no longer susceptible to them. In one instance, constant change of scene and place, by occupying the patient's mind with new ideas and pleasant thoughts, kept the disease at bay. We may lay down golden rules, but the circumstances of life seldom admit of their being observed faithfully or consistently. A man is obliged to live in a large town, and, from bad air and want of exercise, he gets severe headaches : if he resides in the country, he loses them. But he has no choice of residence ; his lot has fallen among the noise and crowd, where all is hurry and excitement, and he is driven forward with the throng, as feeble to oppose it as the stream of a gentle rivulet is to reverse the course of the mountain torrent into which it falls.

When a nervous headache is threatening, the patient should lie down and observe the strictest seclusion and rest; and if this be done at an early stage, a severe attack may sometimes be averted altogether. The sudden influx of light when the curtains are drawn up of a morning in a darkened bedroom, may instantaneously cause the return of a bad attack, previously stopped by a good night's rest. Mr. May, of Reading, once had under his care a most remarkable case of a lady subject for years to "intense headache and intolerance of light, commencing on first awaking in the morning, and persisting more or less all day." The immediate effect of the first influx of light was to cause a severe frown, followed by headache. Mr. May cured the patient by covering one eye with a card to which was attached an elastic tape, and this was passed round the head, so as to slightly compress the occipito-frontalis and corrugators. "This simple device effectually prevented the frown, and there was at once an end to the mischief." The eyes were afterwards gradually accustomed to light by being alternately covered and uncovered by the card for two hours at a time, so as to regulate the admission of light. The patient completely recovered, and remained free from headache till her death about eighteen years later.*

When persons derive benefit from lying in a recum-

* The case is reported by Mr. Hilton in his lectures *On Rest and Pain*, 2nd Edit., 1877, p. 147.

bent posture, and taking a glass of wine or some other diffusible stimulant, at the beginning of the attack, the cerebral vessels are insufficiently supplied with blood ; and hence, by stimulating the heart's action, the blood is propelled to the cranium with increased force, and relief is obtained. This is the stage and form of headache where people (especially fashionable ladies) over-fatigued from driving and excitement in the London season lose their headaches as the dinner advances, and they consume more wine than is advisable. The feet and hands are often cold at this stage, the skin is shrivelled and dry, and the pulse is slow and weak ; there are in some cases glimmering flashes of light before one or both eyes, and the patient is depressed, prostrate, and helpless. She both feels and looks wretchedly miserable. When altered sensation has not entirely merged into pain, irritability, agitation, and disquietude are the prevailing features of the affection. Now, I believe that if a stimulant is to be of any service, it should be given at the onset of the symptoms ; and if there exist nausea, or more certain derangement of the digestive organs, we shall certainly increase the evil by the exhibition of a stimulant. And why ? Because the ganglia of the sympathetic nervous system, being exceedingly impressible, transfer the irritation from the splanchnic and gastric nerves to the nervous centres in the brain, causing the vessels to become unduly dilated through

the action of the vaso-motor nerves, and so the headache becomes more violent and throbbing than when the encephalic supply of blood is diminished.

During the acute stage of a severe nervous headache, there is little to be done after applying cold to the head by means of a sponge wrung out of cold water, or the ice cap previously spoken of. It is the best plan to leave the patient alone and quiet in a darkened room. If we put anything into the stomach, we shall increase the nausea and aggravate the pain. I have sometimes known a warm bath, and afterwards a bottle of hot water to the extremities, afford relief, by dilating the systemic vessels, and in some way altering the circulation within the head.

“Heat and cold are two of the remedies used to lessen headache; sometimes one is useful, sometimes the other, and, so far as I know, no explanation has hitherto been given of the reason why. I believe it is simply this: that when heat is applied over the contracted peripheral vessels, it tends to relax them, and thus restores the equilibrium between the different portions of the artery; when cold is applied over the dilated vessels, it causes them to contract, and thus restores the equilibrium between them and the contracted peripheral parts.”*

If the pulse be good, whether the face be flushed or not, an emetic of mustard, ipecacuanha, or a

* ‘On the Pathology and Treatment of some Forms of Headache,’ by T. Lauder-Brunton, M.D., F.R.S.—*St. Bartholomew’s Hospital Reports*, vol. xix. p. 334.

scruple of sulphate of zinc (Form. 108) will rid the stomach of any offensive matters, and give immediate ease. I have for some years frequently ordered patients, when a sick headache was commencing, to take a scruple of ipecacuanha in two ounces of water, and follow it up by drinking a tumblerful of warm water till free vomiting ensues. This empties the stomach most effectually, not only of its contents, which remains as an undigested load there, but of a quantity of acid, irritating ropy mucus. By free vomiting the congested mucous membrane is relieved, and the fermentative process is speedily arrested. I have also prescribed in similar cases a teaspoonful of bicarbonate of soda in water, vomiting to be encouraged by drinking plenty of warm water after it; great relief will often follow this proceeding. If the headache has begun with cold feet and hands, contracted pulse, and general malaise, a freely acting emetic will relax the whole arterial system, and favour a return of warmth to the surface. I formerly knew a young lady who obtained relief from a nervous headache by drinking a tumblerful of warm water twice or three times a day, and this she sometimes did with equally good effect at meal-times.

If nausea and vomiting continue after the action of the emetic, hydrocyanic acid may be given alone (Form. 41), or with citrate of potash in effervescence (Form. 42). A mustard poultice, or a mustard leaf to the epigastrium, or at the back of the neck, and a

piece of ice to suck, are also worth trying. Soda water, with a little dry champagne or brandy, sometimes answers well, and the patient may at once feel relief and fall asleep afterwards ; but any alcoholic stimulant frequently aggravates the symptoms, and I now seldom resort to it, unless the patient is pale and exhausted.

An active aperient given at night, when the attack is threatening, or an ounce of the compound decoction of aloes, will often avert the pain altogether after two or three actions of the bowels (Form. 43), if the patient will remain perfectly quiet in her room the next day, and take the lightest diet, and carbonate of ammonia, potash, and quinine in effervescence (Form. 44) ; but if she persists in getting up and resuming her duties, the mind is put upon the stretch
• • too early, and headache returns in its worst form.

When the headache is coming on, and the patient is irritable and can obtain no sleep, a mixture of bromide of potassium, sal volatile, and camphor water may be given with great advantage (Form. 26), or the bromide of potassium with the carbonates of ammonia and soda in effervescence with a few grains of citric acid (Form. 25 a).

I have often prescribed *Bishop's Effervescing Citrate of Caffeine* in both nervous and neuralgic headaches, and in many cases when a seizure is threatening, one or two teaspoonfuls have warded it off. The confusion of ideas and discomfort that precede the attack are at once relieved, if given at this stage, but if the

remedy be delayed till the pain is severe, it frequently fails. It has repeatedly done so in my hands. Women subject to violent nervous headache, at the time of the period, or immediately after it, get relief from one or two doses. *Corbyn's Effervescent Bromo-Caffeine* acts in a similar way, and is sometimes of much service. A large teaspoonful contains one grain of caffeine hydrobromate. *Caffeine tabloids* have been used hypodermically, and very successfully in malarial neuralgia. Each tabloid contains half a grain of caffeine. Eulenberg prescribed it with success in occipital headache (neuralgic), and Lorent in migraine and other forms of nervous headache.*

If the patient, too, is in any way excited as the attack threatens, and there are transient *flushings* of the face, and a sense of overpowering heat and faintness (by no means uncommon in women at the

* It has been ascertained as the result of experiments on different animals, when under chloroform or curare, that the effects of caffeine citrate on the general blood-pressure is to produce in the first instance a diminution in the force of the heart-beats; secondly, an increase in the force of the heart, and a distinct slowing of the rhythm, occasionally followed by a slight but persistent acceleration. In the first instance, there is a fall of arterial pressure, which may regain, or slightly exceed its normal height during the second stage. The action of the drug on the kidney is much more persistent than its action on the general blood-pressure. The effects of the injection of moderate doses of citrate of caffeine on the kidney are to produce contraction of the peripheral vessels of the kidney and spleen. This constriction is followed by a very persistent expansion, and in the case of the kidney is accompanied by a marked increase in the amount of urine secreted.—‘On the Action of Certain Drugs on the Circulation and Secretion of the Kidney,’ by C. D. F. Phillips, M.D., F.R.S.E., and J. Rose Bradford, B.Sc., M.R.C.S., *Journal of Physiology*, vol. viii., Nos. 3, 4.

climacteric period), a full dose of bromide of potassium will be extremely beneficial by allaying the mental disquietude and subduing the excitement on which the distressing symptoms depend. If it is given at the right moment, before the headache has set in completely, it will frequently arrest the approaching paroxysm altogether; the patient will fall into calm sleep, and wake up well, provided she will aid the cure by absolute repose.

Cannabis Indica sometimes proves a useful sedative in this form of headache. I have prescribed it in many cases, sometimes with success, and as with many other vaunted remedies, frequently with failure. It is a remedy that should be given with caution, and the dose, in delicate persons, should not exceed a quarter of a grain to begin with, as its action is uncertain and variable—some persons being more susceptible than others. It often causes giddiness and other unpleasant symptoms. A graphic account is given by Dr. H. C. Wood, who took a large dose of the American extract for experimental purposes. It produced, in the first instance, exhilaration and excitement, followed by nightmare sensations, acceleration of pulse, dilated pupils, unconsciousness, and the feeling of impending death. No after consequences, as headache, nausea, or constipation, ensued.*

In neuralgic and nervous headache Indian hemp is sometimes of service, whether there be nausea or not.

* *Treatise on Therapeutics*, 1876, p. 226.

By inviting sleep and calming the nervous system, it seems to have the effect of lengthening the interval between the seizures. It is a remedy to be persevered with before we condemn it to failure. If its use be continued for a considerable period, it will in many cases ward off the attacks. Dr. Wilks prescribes one grain in the form of a pill, night and morning, for some weeks.* If the headache depends upon ovarian or uterine irritation, particularly dysmenorrhœa, it may prove of advantage. In twelve cases in which I prescribed it in the form of pill (half a grain night and morning), three of the cases were relieved. These patients generally woke with the pain before taking it. In four others, the attacks became less frequent and severe. In combination with valerianate of zinc it seems to be beneficial, and particularly, as before mentioned, with bromide of potassium. As one patient said, "it lessens the pain, and enables me to bear the headache." Dr. Stephen Mackenzie has published a series of cases in which it proved very valuable in *continuous* and *paroxysmal* cases of headache. The continuous headache was that which rewarded its use with the most success. He usually begins with half a grain night and morning, and gradually increases it till two grains are taken at night and one grain and a half in the morning. If constipation be present it may be combined with an aloetic pill, or with quinine,

* *On the Nervous System*, 2nd edit., 1883, p. 555.

carbolic acid, and assafoetida pill if there be flatulence (Form. 92-92 *a, b, c, d*).*

Valerianate of zinc is a remedy which often proves serviceable in nervous headache, if there is no sickness, and if the pain is chiefly on one side of the head. It is a powerful nervine tonic, and may possibly exert some physiological effect on the nervous centres. It may be given alone in the form of a pill, or with quinine or rhubarb, or, as just stated, with cannabis indica (Form. 87). If the headache is associated with anæmia, it may be ordered in combination with sulphate of iron (Form. 97). The late Dr. Symonds, of Clifton, was in the habit of prescribing oxide of zinc, extract of valerian, and extract of hyoscyamus together;† and Dr. E. Liveing quotes a case of paroxysmal headache completely cured after the administration of twenty-four grains of valerianate of zinc.‡

Oxide of zinc alone has been found of use in a few cases (Form. 98). Oxide of silver in half-grain doses, with two grains of extract of hyoscyamus in a pill at bedtime, effectually removed an obstinate nervous headache due to irritation of the sympathetic nerve, after the failure of other remedies.

Chloride of ammonium is most beneficial in some

* 'On the value of Indian Hemp in the Treatment of a Certain Type of Headache.'—*Brit. Med. Jour.*, January 15, 1887.

† 'Gulstonian Lectures on Headaches.'—*Medical Times and Gazette*, 1858, vol. xvi. p. 496.

‡ *On Megrin and Sick Headache*, 1873, p. 448.

nervous headaches, and frequently in the neuralgic variety. It has proved so successful in my hands that I look upon it as an invaluable drug. The cases in which I have found it most useful are—

1. Those of the typical neuralgic, or one-sided headache.

2. Occipital and frontal headache occurring in nervous subjects, with a tendency to extend over the whole head.

3. When there is oppression and heaviness in the whole head, and a feeling, as a patient described it, "of something being tightened in the head like a thumb-screw."

Chloride of ammonium is specially adapted if the urine is scanty and high-coloured, as it is in some attacks of nervous headache. These cases, as a rule, are less persistent than those where there is excess of arterial tension, and the urine is copious and limpid. In a few cases it produces acidity in the stomach, and so increases the headache ; but I have known the same to occur from bromide of potassium. I seldom exceed twenty grains three times a day, and never go beyond thirty-grain doses. It is probable that its good effects are owing, in some measure, to its stimulating properties on the liver, as well as on the nervous system generally. When the patient is racked with torture, a few doses of chloride of ammonium and hydrate of chloral combined, will often lessen the suffering, and invite sleep. In the

more chronic cases I combine it with a little taraxacum, and infusion of calumba (Form. 27 *a*). I have elsewhere stated that chloride of ammonium proved of great service in the headache of Bright's disease.*

Frontal headache is often aggravated by quinine, whether the digestive system be at fault or not. It can almost always be borne when the pain becomes one-sided. If the patient has any of the symptoms common to nervous headache, as a dull continuous pain over the eyes and across the forehead, with inability to face the light, chilliness and sickness, and a full or bursting sensation in the head, quinine will increase the suffering tenfold. Nausea alone contraindicates its use. The best remedy in such a case is a tumblerful of warm water, or mustard and water, to produce free vomiting, and warmth to the extremities, that blood may be invited to the surface. Quinine in combination with a little aloes, or a few drops of spirit of chloroform, acts as a gentle nervine stimulant both to the brain and nervous system ; and the cases most adapted for it are those where the tongue is clean, and the digestion is good. In large doses it frequently causes giddiness and noises in the ear. In hemicrania, five-grain doses taken every hour have an excellent effect in relieving the pain, in lengthening the intervals of attack, and in calming the circulation. When the pain shifts to one side of the head, and is confined to a small spot or space, belladonna ointment

* See Chapter IX., on Toxæmic Headache.

or aconitina ointment may be rubbed into the temple at the same time (Form. 110-113), and the quinine persevered with as in the neuralgic variety of the affection. The teeth must be carefully examined to ascertain whether any are decayed, as pain in the temporal region is a common result of it. When quinine causes headache it is well to combine it with hydrobromic acid (Form. 14). I am in the habit of prescribing, with much advantage in these cases, the bromide of potassium and tincture of quinine together (Form. 13), and I am fully satisfied that the headache and nervous excitability would not have yielded to the quinine alone.

Dr. Trusevich has published some observations on the treatment of headaches by Nitro-glycerine ;* and he arrives at the conclusion that those cases which depend upon a vaso-motor constrictor neurosis, are immediately curable by nitro-glycerine. He considers the chief indications for its employment are pallor of face, a paroxysmal character of the pains, as in genuine neuralgic headache, their augmentation on pressure of the carotids, and their diminution when the head is lowered. In another communication Dr. Trusevich has drawn attention to the efficacy of nitro-glycerine in pure anæmic and more or less persistent headache, as well as in those cases which are associated with inanition of the brain after excessive

* *Ejenedelnaya Klinicheskaya Gazeta*, Nos. 26-28, 1887. Translated for me by Dr. Theodore Maxwell. See also *Lancet*, December 3, 1887, p. 1135.

mental effort.* Among Dr. Trusevich's cases is one recorded of intense migraine in a woman coming on before the menstrual periods, so that she could scarcely speak, and had difficulty in breathing. She would go to bed and tear her clothes from the pain in her head. Nitro-glycerine relieved her in a minute, and she slept till morning. In another case of migraine, in a girl eighteen years of age, the pain departed in four minutes, but in seven minutes she had palpitation, which lasted an hour. More rapid was the relief afforded to a courier, forty-seven years of age, who suffered from pain in the left temple, extending to the whole head, which left him in two and a half minutes. An officer in the Austrian Navy had such intense pain in his head that he could scarcely stand. By licking the stopper of a one per cent. solution of nitro-glycerine the pain was better in twenty seconds, and the dose being repeated it had almost gone in forty-eight seconds.

In *nervo-hyperæmic* headaches nitro-glycerine is useful by dilating the systemic vessels, and thus relieving the congestion of the cerebral vessels. It appears to be injurious in headaches depending on passive hyperæmia, and hence equally useless in headaches due to diseases of the heart, lungs, or liver, which cause passive congestion in the cerebral vessels. In prescribing this remedy, it is difficult to instruct the patient to take it at the right moment. If the time be seized when the extremities are cold,

* 'Allgemeine Medicinische,' *Central Zeitung*, No. 21, 1887.

the urine is copious and pale, and the whole arterial system is in a state of tension, its action by inviting blood to the general surface may possibly relieve the brain. Dr. Trusevich found that two or three one-drop, or two-drop, doses of the one per cent. solution placed upon the tongue at intervals of a few minutes arrested this form of headache; but from my own experience I have found more relief given at this stage by drinking one or two tumblerfuls of hot water, which promotes vomiting, and rids the stomach of its acrid contents, at the same time inviting warmth to the surface.

The inhalation of chloroform in acute nervous headache sometimes controls the severity of the paroxysm, and induces sleep; but if there is any nausea, it is rarely of service, and usually provokes vomiting, which distresses the patient, and, in some cases, increases the suffering.

Guarana is obtained from the seeds of *Paulinia Sorbilis*. It is imported from Brazil. It contains a crystalline principle called *Guaranine* which is identical with caffeine, and may be given in the same dose and for the same class of cases where a nervine tonic is indicated. The dose of the powder is from thirty to sixty grains in water, with an equal quantity of sugar, and repeated in half an hour if it does not afford relief. The tincture in drachm doses, or twenty to thirty minims of the extract (*Ext. Guarana Liq.*) in an ounce of water, are more reliable forms of

administration. The tincture is made more agreeable by adding an equal quantity of Simple Elixir.*

Guarana has not proved a very successful remedy in the few cases of nervous headache in which I have employed it, but many medical men have borne testimony to its efficacy on the first symptoms of headache making their appearance. Dr. Latham speaks well of it when taken as soon as there is glimmering in the field of vision, pain in one temple, and nausea or vomiting.† Dr. Wilks also gives testimony in favour of it.‡ As it appears to stimulate the vasor-motor nerves, and so to diminish the supply of blood to the brain, it would have no good effect, probably, in the early or premonitory stage, when of long duration; but at a later stage, if the headache is severe, and attended with throbbing of the temporal arteries, it may succeed when the bromides and other remedies fail. This remedy is also of service in the genuine neuralgic headache (hemicrania).

In one of my patients guarana had the effect of causing a rush of blood to the head, and making her face crimson without any other effect.

Antipyrin has been under the notice of the profes-

* Spirit of Orange (Dil. j., Rect. Spt., 9), ʒss.

Rectified Spirit ————— ʒivss.

Distilled cinnamon water, syrup of each, ʒvj. Mix and filter.

Dose, 20 minims to ʒj.

Which may be added to the ounce of any liquid medicine.—Martindale.

† *On Nervous or Sick Headache*, 1873, p. 69.

‡ *Medical Times and Gazette*, January 2, 1869.

sion for some time as an important remedy in reducing the temperature of febrile diseases. Recently it has been extolled in France as valuable in headache, but Russian physicians seem first to have suggested it in the migraine type. It has for some time past been successfully given in Germany. In twenty-grain doses, morning and evening, it is said to cut short the paroxysms, and to act as a specific.* Dr. Warren-Bey records a case in which fifteen grains three times a day removed the pain from which the patient had not been free for several years.†

Dr. Berthold, of Dresden, prescribes it in doses of half a gramme "in the aura, before the attack comes on." If the patient feels, in the evening, that an attack is impending, she should take a dose before going to bed; and if, notwithstanding this, she still feels, in the morning, that the seizure is probable, she must take a second dose, and remain in bed one or two hours. This treatment will, in most cases, suppress the attack.‡ Dr. Theodore Maxwell has found antipyrin very effectual in migraine and other cephalalgias, particularly those of nervous and rheumatic origin. In one case, under his care, of periodically recurring migraine, where the pain seized a single spot on the right parietal bone, antipyrin almost entirely arrested the seizures, and morphia injections previously used were given up for many

* *Medical Times and Gazette*, September 28, 1887.

† *Brit. Med. Jour.*, October 15, 1887.

‡ *The Lancet*, November 5, 1887, p. 948.

months.* I have prescribed it with partial success in a few cases. In many it has not had the slightest effect for good or evil. The most notable case was that of a nurse, thirty years of age, who suffered fearfully from attacks of migraine, attacking one side of the head, forehead, and occiput. There was vomiting and inability to face the light, and the patient was obliged to take to her bed. A dose of fifteen grains would bring relief in two hours, and enable her to resume her work. It is the only remedy that has ever given her such speedy relief. I have lately prescribed it for a medical man, who for many years has suffered from bad attacks of nervous headache, and it has given great relief. A lady who consulted me from Devonshire in October, 1887, said it was the best medicine she had ever taken in lessening the pain, and shortening the paroxysm. Speaking from my own experience, I should say the drug has yet to be discovered that will speedily arrest any form of nervous headache. The attack may sometimes be lessened in severity, but it is seldom cut short by any single remedy. The storm in many persons cannot be prevented from pursuing its course. It will last for an indefinite time, do what we may. Even when the pain is severe enough to demand such a measure as the hypodermic injection of morphine it will often return, because the fit has not expended itself. How is it possible that the same remedy shall

* *The Lancet*, November 12, 1887.

act with unerring certainty in all conditions of vaso-motor disturbance? With unequal distribution of warmth to the body, there is unequal distribution of blood; the general surface is chilly, the feet are cold, and the pulse at the wrist is small, whilst the cerebral vessels are dilated, and there is an increase of blood-pressure. Having satisfied ourselves as nearly as we can that the disorder is a genuine neurosis, or one dependent on gastric or intestinal derangement, we must proceed to treat it on general principles.

It is important to be aware of the fact, that antipyrin is sometimes followed by very unpleasant symptoms, and therefore its action should be carefully watched. These symptoms are numerous, and include giddiness, intense itching, erythema, general urticaria, swelling of the throat, conjunctivitis and acceleration of the pulse. In February, 1888, I prescribed fifteen grains of antipyrin for a lady who had nervous headache. She took three powders in the course of twenty-four hours, with much relief to her head, but soon afterwards the eyes became inflamed and the face swelled. The thorax, arms, legs, and thighs were covered with an erythematous rash, resembling that of scarlatina, but, the pulse and temperature being normal, I was able to set the patient's mind at rest. It appeared to me that the rash was caused by the powders, and the patient was of the same opinion. It gradually passed away by the third day. Professor Germain Sée has stated, that once in twelve or

fifteen cases, antipyrin produces an eruption, having the appearance of urticaria. He says, that if alarming symptoms should follow its absorption in small doses, they may be relieved by belladonna, and where there is real danger from large doses, by the hypodermic injection of atropine.* Cases of poisoning by it have been recorded in the *New York Medical Record*, and the *British Medical Journal*, and by Mr. Oscar Jennings.†

Enemata of Hydrate of Chloral were recommended some years ago as proving highly successful in severe attacks of migraine. A case is related by Dr. J. Seure (*Bulletin Gen. de Therap.*), in which a lady was in the habit of injecting into the bowel about two tablespoonfuls of water, containing seven or eight grains of chloral; in a few seconds afterwards she experienced a sensation of numbness, and a taste of chloral in her mouth. Gradually the headache disappeared, the nausea was allayed, and only a little torpor and slight discomfort in the head remained. Twenty grains are usually enough, but men may require double the quantity. Dr. Seure found that if a tablespoonful of brandy or whisky was added to the enema, relief was more quickly obtained. It may be well worth trying where there is great nausea, as it does not disturb the stomach.‡

Hypodermic Injections.—When one remedy after

* *Bulletins de l'Académie de Médecine*, September 6, 1887.

† *The Lancet*, February 25, 1888.

‡ *Medical Press and Circular*, September 13, 1879. See the action of Hydrate of Chloral in Chapter VIII., on Nervo-Hyperæmic Headache.

another has failed to afford the sufferer any relief, and he is getting from bad to worse, there is nothing equal to the subcutaneous injection of morphine. In giving any form of opium by the mouth, the primary effect is stimulating and exciting, with increase of headache, but by the skin it acts as a sedative at once. There can be no question as to the propriety of employing it in properly selected cases. It will be asked what are these cases? The answer is, such a degree of pain as is telling on the bodily strength and powers. Acute and continuous pain is its indication. If a sufficient dose be used, benefit is instantaneous, and in the majority of cases, the patient is at once relieved, falls off to sleep, and wakes up free from suffering. Morphine, when injected beneath the skin, passes from the tissues into the blood, and through the blood it is absorbed and acts upon the nerve-centres. There is no other way of introducing it into the system which has the same instantaneous and beneficial effect. In my experience, the hypodermic method has been perfectly harmless when judiciously employed. No loss of appetite, constipation, or renal disturbance has ensued. The worst result I have observed is nausea and vomiting, and this usually in those cases where they have been present beforehand. In a patient of mine, a martyr for many years to periodical headache, I usually employ a large quantity, frequently half a grain, as the result of immediate vomiting after the hypodermic injection,

is to counteract the effect of the drug. A smaller quantity frequently fails to afford relief.

I have very seldom known any irritation to follow the introduction of the syringe, and at the end of two or three days the spot where it has entered the skin is hardly noticeable. I invariably wash the arm over the seat of puncture with soap and water before injecting. I then apply a solution of carbolic acid (1 in 40), and before inserting the needle under the skin dip it in carbolic oil (1 in 8). In all the cases in which I have employed the subcutaneous injection of morphine I have never met with ecchymosis, hæmorrhage, nor abscess, nor indeed with any swelling from the injection of air ; but I have known some persons, with a sensitive skin, suffer considerable itching and irritation about the punctured spot for some days. I am extremely careful to disinfect the syringe, and to pass through it a weak solution of carbolic acid several times before proceeding to inject. Cleanliness of the canula, and of the hands of the operator, are indispensably necessary to guard against the accidents referred to. The injection should be of the temperature of the body. The fore-arm is about the best part to choose for puncture, as the injection causes less irritation there than on the trunk, or wherever there is much subcutaneous fat. In introducing the needle into the cellular tissue, the operator should seize a fold of the skin between the thumb and index finger, and then, having put it on the stretch, the needle is

to be quickly inserted at the base of the fold to the required distance. This having been done, the finger is removed from the fold of skin, and the canula being steadied by the thumb and forefinger of the left hand, now set free, he expels very gradually the fluid by pressing the piston with the right thumb. In expelling the fluid it is well to pause occasionally, and to press a few drops by a rotatory movement as the canula is being withdrawn. Above all things, avoid injecting too much fluid in one spot. This having been done, the tip of the forefinger, previously dipped in carbolic oil, should be pressed on the point of puncture for a minute or two, and after this, a thin antiseptic pad applied, and retained in its place by a slight bandage. Dr. Taylor, House Physician to the Roosevelt Hospital, has seen no more effect than a little redness and induration, and these only in one or two instances. Of three thousand injections of different substances, such as Magendie's solution, atropine, quinine, whisky,* digitaline, ether, carbolic acid, etc., abscess did not follow in a single instance. In about thirteen months, a male patient, whose attacks of spasmodic asthma were only controlled by morphine, had over a thousand hypodermic in-

* Some years ago, in giving bichloride of methylene to a lady fifty years of age, whilst Sir Spencer Wells removed an ovarian tumour, sudden syncope came on, and death threatened from the effects of a protracted and difficult operation. At this crisis I injected one drachm of brandy with a hypodermic syringe into the right arm. I believe that this saved the patient's life, but it led to a slough the size of a crown-piece. In similar cases of exhaustion I should now employ ether.

jections, without causing the least local trouble, although the solutions were not always fresh, and often contained *confervæ*.* Morphine may be hypodermically injected in most cases with safety if the quantity is small to begin with. No remedy with which I am acquainted has given such speedy and good results in those severe forms of headache, where it is probable that the nervous centres are in a state of extreme susceptibility. If it does not completely remove the pain, it induces sleep, or gives that amount of repose which renders the patient indifferent to all that goes on around ; and in this way the brain gets rest from those harassing thoughts and miserable speculations which haunt the poor sufferer, and from which there is no escape without it. I repeat what I have elsewhere written, as it bears on some points under consideration.† When the sickness and prostration are extreme, and nothing can be retained on the stomach, not so much as a little iced water ; when the extremities are getting cold, and the pulse is contracted ; when there is intolerance of light and sound, and the patient is reduced to a pitiable condition through constant pain and sleeplessness, the hypodermic injection of morphine comforts the patient at once. If it does not cause almost instant sleep, the patient is quiet, composed, and tranquil, the surface becomes warm and the pulse improves.

* *New York Medical Record*, August 26, 1882.

† 'On the Treatment of Different Forms of Headache.'—*The Lancet* vol. i., 1875, p. 854.

In these cases of severe nervous headache I have, since 1877, frequently used the hypodermic injections, seeing that on previous occasions all other remedies have failed, and, therefore, it was prolonging the agony of the patient to wait. Immediate relief has followed. I would urge the employment of the drug when the patient is distracted with agony, though the pulse be slow and weak, and the features are collapsed. There will be no risk in employing it at this stage of depression, especially if the sufferer has been accustomed to it, as he is then more tolerant of the drug. The effect is sometimes marvellous. The hypodermic syringe is scarcely removed from the arm before the patient turns on one side, and drops into sound sleep in less than two or three minutes. He requires only to be left alone and undisturbed for some hours, when in all likelihood the pain will be relieved. Whether vomiting be present at the time of injection or not, it often follows it, sometimes almost immediately, but it does not always diminish the effect of the remedy. The patient will often wake up at irregular intervals, and be seized with violent vomiting and retching for some minutes. When the pain in the head departs, nausea becomes one of the most distressing symptoms. If retching recurs from time to time, a teaspoonful of brandy in a little soda water, or a glass of dry champagne, will often arrest it.

However called for the hypodermic injection of morphine may seem, its long-continued use has a

prejudicial effect on the blood and tissues. Except in organic headache, and the most severe forms of nervous and neuralgic headache, the hypodermic injection of morphine ought not to be resorted to. If too frequently employed, it may have as bad an effect as opium-eating, or spirit-drinking. The patient will become sallow, pale, and worn. In extreme cases it must be used at any cost ; but if the attacks are only moderate in severity, the patient should never be treated with the drug, for fear of its being unnecessarily resorted to. This I have known to happen on a few occasions, and more than once for the patient to procure a hypodermic syringe, and to carry it about with her.

Dr. Seymour Sharkey in an interesting article on *Morphinomania*, says that we meet occasionally with women of hysterical and neurotic temperament, of heightened sensitiveness and fertile brain, to whom morphine in this form is very acceptable. It is certain that the dream-like comfort and forgetfulness that follow the injections tempt this class of women to resort to the practice.* It is an indulgence, a baneful luxury, which appears to be spreading in the chief cities of Europe, where life among the votaries of fashion is so often frivolous and sensational. And so a moral disease is invited from which the sufferer seeks deliverance by the enervating effects of opium. When once the habit is yielded to, energy,

* *Nineteenth Century*, September, 1887.

health, and happiness are one by one surrendered, and gradual failure in the mental and physical functions ensue. Those persons who look upon it as a harmless diversion may have had it first used for some painful disease with the sanction of their medical attendant, but they should be told that if they fall into this detestable habit, a grave danger is lurking about them, and that unless abandoned at once, for there is no middle course, life will be shortened and made miserable whilst it lasts.

The pages of medicine teem with the dangers to life that sometimes follow the hypodermic injection of morphine in large or even in small doses. As many fatal accidents are recorded, it is important to recognise the risk of its too frequent or indiscriminate employment. An over-dose of morphine given by the mouth may be nearly all got rid of without subsequent danger, if the patient be healthy and medical aid be at hand ; but if injected through the skin, emetics and similar means are of little or no avail, and we have to trust to such antidotes as the hypodermic injection of atropine or strychnia, electricity, and artificial respiration. The 1-25th of a grain of atropine is required to counteract each grain of morphine. I invariably employ atropine with the morphine injection, and hitherto I have never witnessed any alarming symptoms ; nor should the circumstance of a person being able to tolerate morphine by the mouth tempt us to believe in its safety by

subcutaneous injection, even in a small dose. A quarter of a grain has been known to cause death ; and in one case, where the natural susceptibility to morphine was very great, death resulted from the twelfth part of a grain injected through the skin, after only a quarter of a grain had been given by the mouth.* Morphine is tolerated very differently at one time from what it is at another. I have known the sixth part of a grain subcutaneously injected prove as rapid and as effectual as half a grain at a subsequent period. Although the hypodermic employment of morphine is attended in most cases with some degree of risk, I consider this risk is minimised by proper care and caution. Injections of morphine are dangerous to those of intemperate habits, or who suffer from toxæmic states of the blood, as in chronic Bright's disease, or any affection of the heart or lungs ; in these cases it is extremely hazardous. The inference I draw of its harmlessness, in the large number of cases, supports the view that a judicious and suitable selection has been made. Whenever dangerous narcotism, or syncope, follow the injection of morphine into the cellular tissue, and it is probable that a vein has been opened, a ligature should be applied above the puncture, and the wound enlarged and freely cauterised.

With reference to the form in which the remedy should be administered, I have every confidence in

* 'The Perils of Morphia.'—*The Lancet*, 1880, vol. i. p. 572.

recommending a combination of morphine with atropine (Form. 116); six minims contain half a grain of morphine and the one-eightieth of a grain of atropine. Atropine increases the sedative effect of the morphine, and combats the tendency to vomiting and constipation which morphine alone excites. Mr. C. Jennings, in a communication to the *Lancet* (March 29, 1884), states that Bartholow writes with much earnestness on the superiority of extemporaneous over permanent solutions of the alkaloids for hypodermic medication; and he adduces a powerful argument against those of the latter character, viz. their rapid tendency to deteriorate from the development of the penicillium, which grows partly at the expense of the alkaloids; and hence, while such solutions increase in turbidity, they decline in power. But there is a still more cogent reason against the employment of permanent solutions of morphine. Every one is aware that apomorphine, which is a speedy emetic, even in minute doses, differs only in formula from morphine, in containing a molecule less of H_2O , or one equivalent less of water; whilst many practitioners have been disagreeably surprised by the prompt emesis consequent on the subcutaneous injection of morphine, few actually realise the fact that morphine, kept in solution for some weeks, decomposes, and yields apomorphine. In order to prove chemically the point at issue, which is, unfortunately, every day being

illustrated physiologically, Mr. Jennings, with the assistance of Professor Bedson, conducted a series of experiments upon various preparations of morphine, apomorphine, and their salts. Nitric acid and perchloride of iron, excellent re-agents though they be for discriminating between morphine and apomorphine when separate, are quite valueless for detecting small quantities of the one when mixed with a comparatively large quantity of the other. Solutions, even the most dilute, of apomorphine and its salts on being boiled with excess of caustic potash, oxidise rapidly, and turn brown, whilst solutions of morphine do not, and this appears to be the crucial test for traces of apomorphine in the presence of morphine.* Less than 1-400th of a grain of apomorphine can be detected by this method, and the examination of solutions of morphine, of ages ranging between two months and two years, demonstrated apomorphine in all; the impurity existing in relatively larger quantity in the older and more discoloured specimens, which are notoriously those especially prone to excite vomiting, and, therefore, certainly unfit for subcutaneous administration. The practical outcome is obvious. In

* I may just mention that the hydrochlorate of apomorphine is the only preparation used, and that chiefly as a quickly acting emetic; but it must be employed with caution, because of the tendency to syncope and collapse which it sometimes produces. The emetic dose is from gr. $\frac{1}{16}$ to gr. $\frac{1}{13}$ for an adult, and gr. $\frac{1}{13}$ for a child. Bourgeois advises gr. $\frac{1}{16}$ for a man, gr. $\frac{1}{8}$ for a woman, gr. $\frac{1}{12}$ for a child.—*Manual of Hypodermic Medication*, by Drs. Bourneville and Bricon, 1887, p. 57. Translated by Dr. Currie.

hospital practice, where the consumption of morphine is large, "permanent" solutions can be used freely, since they are in reality "extemporaneous." But in private practice the case is different. Here hypodermic medication is often not resorted to for weeks together, and the use of extemporaneous solutions is loudly called for. On this consideration Mr. Jennings obtained samples of sulphate and bimeconate of morphine, in the form of Wyeth's compressed tablets, prepared about three months previously. None of the solutions of these tablets, on being boiled with caustic potash, and subsequently being agitated with air, turned brown. Should clinical trial of the tablets fulfil the expectations which may be formed of them from chemical evidence, their extensive employment would be advisable.

For fuller information as to the various drugs which are employed for subcutaneous administration, the reader is referred to Bartholow's able treatise,* and to the selected formulæ at the end of this volume. It is not advisable, however, that this form of treatment should be adopted quite so freely as Bartholow recommends: most remedies answer their purpose sufficiently well when administered by the more usual channels, and subcutaneous injection should clearly not be resorted to, whilst the ordinary methods of medication fulfil their object.

* *The Treatment of Diseases by the Hypodermatic Method*, 4th Edit., 1882.

A gentleman, forty years of age, consulted me in July, 1884, with the history of severe headache coming on at twenty years of age, the attacks recurring at intervals from one week to two months. The chief symptoms were extreme pain in the lower part of the back of the head, at the top of the neck, which caused an involuntary throwing back of the head as far as possible. This would last from thirty-six to forty-eight hours, without sleep or the possibility of lying down. The attacks were sometimes preceded by pain on one side of the head, or over one eye, or by a feeling of soreness through the brain. The causes seemed to be, want of sleep, overwork mental or physical, neglect to take food in sufficient quantities, over-eating, and occasionally exposure to cold. Sometimes the attacks could be traced to no special cause, and they would come at no particular time of day or night. After trying all kinds of remedies for ten years, the patient was completely prostrated, as he seldom went a week free. Recourse was now had to the subcutaneous injection of morphine during the attacks. He immediately recovered his strength, the headaches recurred at longer intervals, and he gained forty pounds in weight in one year. After using hypodermic injections, he was advised to try guarana, chloral, bromides, electricity, etc., but without permanent benefit. Three years before I saw him, he became sleepless and more prostrate, pain following slight exertion or attention to business.

Two years of rest, and a residence in the White Mountains, two thousand feet above the sea-level, did not give him any relief. In the summer of 1883, he spent six weeks in the same place, taking only a little exercise, *and during this time he had almost complete relief from headache.** The patient stated that after using morphine for ten years, it had about the same effect as when he first began, and he does not require any larger dose. It is only used to relieve pain, and not to ward off a headache. He uses gr. $\frac{1}{4}$ to gr. ij. in twenty-four hours, during an attack. The sooner it is used, after an attack has commenced, the smaller is the quantity required to obtain relief, whilst two grains might be necessary after a day's suffering.

In the intervals of the suffering we may reasonably expect to mitigate the severity and frequency of the paroxysms, provided the patient can and will carry out our instructions.

* The experiments and observations of Dr. C. Theodore Williams "indicate that compressed air exercises an intropulsive influence, affecting, naturally, those surfaces most exposed to it, such as the skin and the lungs; the blood is thus driven into the organs protected from air-pressure, such as the brain, the heart, liver, spleen, and kidneys." The converse obviously holds good, viz. that diminished barometric pressure—and this, too, has been demonstrated by experiment—would exhibit an extropulsive power, so that the blood would tend to leave the organs protected from air-pressure, such as the brain, etc.; and the case quoted in the text is illustrative of this natural law, where the patient experienced relief from headache, whilst living in quietude at an altitude of about two thousand feet above the sea-level. The reader is referred for valuable information on this subject to Dr. Williams' Lectures, in the *British Medical Journal* of April 18 and 25, and May 9, 1885.

When a severe headache has passed off, the stomach is often deranged from the remedies employed, or the sympathetic disturbance set up in the various organs. Here an alkali with the aromatic spirit of ammonia and a vegetable bitter has a good effect (Form. 45-45 *a*), and a mild aperient pill at bedtime (Form. 99), particularly a small quantity of iron with aloes and myrrh to empty the large bowel (Form. 85-86). When the tongue is clean and the secretions are in proper order, iron, in effervescence, is a valuable remedy, twice or three times a day after food, and sometimes strychnia may be added to improve digestion and accelerate the capillary circulation (Form. 46). In the case of women, where the menstrual functions are deficient and the bowels sluggish, five grains of the iron and aloetic pill, of the British Pharmacopœia (Form. 85), will answer well, whilst the nitro-muriatic acid in infusion of quassia, with small doses of strychnia, may be employed during the day, or the tincture of nux vomica, which answers better with some persons (Form. 47-48-48 *a*). A dinner pill given daily before the mid day meal will sometimes prove of service (Form. 77), or one or other of the formulæ (78-81 *a*-100-101).

Dr. Lauder-Brunton says that frontal headache, when attended by constipation, is relieved by purgatives. If there is no constipation, and the pain is over the eyebrows, it is relieved by acids; if just below the hairy scalp, it is relieved by alkalies (Form.

45-45 a).* I cannot speak definitely as to the pain yielding to an acid or an alkali, according to its situation. In prescribing either I should be guided mainly by the general symptoms, and the character of the headache. With a clean tongue and regular bowels, where there is languor and debility, the mineral acids sometimes answer well, whether the pain of the forehead is situated high or low ; but no form of frontal headache will yield to this treatment if the tongue is loaded and the bowels are torpid. Such cases are more likely to benefit by an occasional mercurial purgative, if the patient is strong enough to bear it, and an alkaline mixture.

In cold weather, if the nutrition of the body is much impaired, cod-liver oil will be found of great service in the intervals of the headache, and a teaspoonful may be given after the two chief meals of the day in a little of Morson's pepsine wine, or orange wine. But fresh air, gentle exercise, and relaxation of mind and body are the chief remedies on which to rely.

Ocular Headache.—Ophthalmic surgeons are acquainted with a variety of headache, arising from excessive or irregular action of the internal or external muscles of the eyeball. Cases have been described in connection with myopia, hypermetropia, and astigmatism, in which the headache is worse after close work, or reading or writing. The affection arises from

* *Disorders of Digestion*, 1886, p. 112. See the remarks on the probable cause of localised headaches, Chapter I., p. 28.

extra strain on the eyes for the accomplishment of minute work, especially needlework and reading small print, close attention at school, and all debilitating circumstances, as over-suckling, child-bearing, etc.

Mr. Brudenell Carter has described a very interesting case of "Vertigo, simulating brain disease,"* in a young gentleman, which came on suddenly whilst reading hard at Oxford. The symptoms were double vision, followed by vertigo, after reading a page, and, if the effort was continued, by sickness, palpitation of the heart and intense headache. When not reading he was, in all respects, quite well. Both eyes were myopic. The internal recti muscles, under the stress of work, became tired, relaxed suddenly and broke down. The eyes being no longer directed to the same part of the page, the lines and characters would appear doubled; then vertigo ensued, faintness, sickness, palpitation, and headache. A permanent cure followed on the use of suitable spectacles. Mr. Carter states that he has met with several cases of headache, or of temporal neuralgia, supposed to be due to intellectual rather than to visual exertion.

When attacks of vomiting and headache come on in young persons who strain their eyes, the symptoms, in some of these cases, are thought to be due to brain disease, when they are really owing to defects of vision, or errors of refraction, which result in myopia,

* *Clin. Trans.*, vol. viii. p. 13.

hypermetropia, or astigmatism. Mr. Couper pointed out many years ago that the optic discs from over-use of the eyes are apt to become red and swollen, a condition which is remediable by spectacles. Overwork of the eyes, says Dr. Hughlings Jackson, causes congestion and œdema of the optic disc, in the same way that overwork of the brain causes congestion and possibly œdema of the brain.* If this simple fact were generally understood; if it were known that the nerves and muscles of the eye are liable to become wearied from overstrain, like other similar structures in the body, giddiness, strabismus, and vertigo would with rest be less frequent, whilst attacks of vomiting and headache after reading would be the exception. The muscles of the eyeball would then act in concert, and one muscle would not be weakened, or partially paralyzed at the expense of another.

Hypermetropic Headache.—There can be no doubt that hypermetropia is one of the most frequent causes of headache in association with defective sight. In this form of disordered accommodation the eye is abnormally short. The eyeball should be naturally long enough, from before backwards, to allow the focussing (or bringing to a point on the retina) of parallel rays—that is to say, of rays from distant objects—by means of the refractive power of the media alone, without the action of the ciliary muscle.

* ‘Ophthalmology in its Relation to Medicine.’—*Lancet*, vol. i. 1877, p. 675.

As the rays of light from near objects diverge, that muscle is set in action when the sight is turned to near objects, so as to act on the lens in such a manner as to increase its refractive power, and bring the divergent rays to a focus on the retina. But when the eyeball is abnormally short, parallel rays cannot be brought to a focus by means of the refractive media of the eye alone, so that the ciliary muscle must act. In other words, this muscle is constantly in action in hypermetropic subjects, except during sleep, whilst in persons endowed with emmetropic vision it only acts during reading, needlework, and similar pursuits where near objects are closely scanned. When a hypermetropic person begins to read, his eyes are already fatigued, the ciliary muscle already in a state of tension has to be made tenser. In short, the eyes in hypermetropia are constantly strained.

In many subjects headache announces the presence of hypermetropia before failure of sight is recognized. The medical adviser must be careful to examine the eyes of any patient complaining of orbital pains and frontal headache, especially if he assert that "my headache makes my eyes red," or "my eyeballs ache as much as my head." This is a form of confusion of cause and effect extremely frequent among physicians as well as among patients.

While young and vigorous, the patient can bear the constant action of the ciliary muscle when viewing distant objects, and that muscle can readily put forth

extra power for the distinction of near and minute objects. But the overworked ciliary muscle becomes weakened far earlier than in a healthy eye, and convex glasses are required for near objects. Then, much to his surprise, the patient finds that he no longer suffers from headache or aching eyeballs, and his friends, who lament that he is compelled to wear spectacles, are forced to admit that they never saw him look so well before. The glasses (which we will assume to be of the proper strength) focus parallel or distant rays perfectly, so as to keep the ciliary muscle at rest whilst distant objects are being viewed ; hence there is no constant strain on that muscle, and hence, also, no consequent headache.

Hypermetropia and its symptomatic headache are constantly on the increase, for, in all classes, the public not only strain their eyes by frequent reading, but owing to the cultivation of the observing powers due to a complicated civilisation, they observe distant objects more than ever. A peasant notices little of what is going on around him ; his eyes are practically asleep, except when used for the inspection of tools, horses, ears of corn, and other matters that immediately concern him. Hence, if hypermetropic, the defect lies latent for a long period, as he seldom troubles about distinguishing distant objects, and never requires any extra strain for reading or minute work.

Hypermetropia is often aggravated by objection

to spectacles, due, not only to vanity, but to the erroneous opinion that glasses weaken the sight. The patient must be imperatively urged to consult an experienced oculist, else, dreading the horrors of waiting-rooms, consulting-rooms, and ophthalmoscopes, he is apt to seek the aid of a spectacle-maker, who is never to be depended upon, for the condition known as latent hypermetropia has to be taken into account, especially in those cases where headache is the most prominent symptom, and latent hypermetropia cannot be tested except by the aid of mydiatics and other measures which must be left entirely in the hands of a qualified oculist.

Twitchings of the eyelids frequently accompany hypermetropic headache; hence the physician must be careful not to put down such symptoms to "liver," "biliousness," or "suppressed gout," an explanation often only too satisfactory to a patient who reckons such disorders as genteel maladies, but looks on defective sight as a badge of age and failing power.

As already stated, headaches sometimes depend upon the other forms of ametropia, namely, myopia and astigmatism. The particular form of ametropia can be most readily diagnosed by means of retinoscopy. These cases should be referred to an oculist for treatment.

Mr. C. Higgins has described "A Form of Muscular Asthenopia" * among those persons whose occupa-

* *Guy's Hospital Reports*, 1875, vol. xx. p. 119.

tion is of a sedentary character, and whose eyes are subjected to long-continued strain. The symptoms are peculiar, and "depend on the want of power in the internal recti muscles, in cases of hypermetropia complicated by strain of accommodation." Both eyes are generally affected. There is pain in the head, chiefly over the brows, or across the whole forehead, coming on occasionally at first, after long application, and disappearing after rest, but later on the headaches are constant. Giddiness is frequent, and the patient is in danger of falling. Dimness of vision, which may terminate in serious damage to the eyes, is not uncommon, if the affection be not remedied by the use of spectacles. When one eye is normal, and the other hypermetropic, the pain may be limited to the affected eye.

Mr. Brudenell Carter, in his *Hunterian Lectures*,* speaks of pain in the eyes, orbital regions, or the head, in *Asthenopia*, or weak sight, in which the patient cannot use the eyes long together. The symptoms begin with indistinctness of vision, or distress leading to lachrymation and congestion of the conjunctiva in some; in others, headache precedes sickness, and there is vertigo, so that the patient fancies he is suffering from some head affection. Dr. Brailey has cited several cases of "*Astigmatism considered in its relation to Headache and to certain Morbid Conditions of the Eye.*"† Here the symptoms

* *Medical Times and Gazette*, 1877, vol. ii. p. 297.

† *Guy's Hospital Reports*, 1878, vol. xxiii. p. 1.

are similar, and the effect of the disease is to confuse the images on the retina, to produce fatigue, aching of the eyes, dimness of vision, supra-orbital pain, and severe headaches.

Treatment.—This consists in complete rest of the eyes, when the headache usually disappears. The symptoms being due to disturbed or excessive muscular action, properly adapted glasses to assist the vision must be worn for all new work, and in a few cases a cure is effected. In all cases the physician must be careful to insist that the patient should wear the glasses recommended by the oculist constantly, or at least for some weeks, or the headache will continue. It must be remembered that in very young children hypermetropia is a common cause of squint. Such drugs as improve the general health, good food, and outdoor exercise will be necessary.

CHAPTER VII.

NEURALGIC HEADACHE.

Relation to Nervous Headache—Its Origin traceable to Decayed Teeth, and other Local Causes of Irritation, as Changes of Weather and Uterine and Intestinal Disturbance—Its Origin in the Special Poison of Ague—Pain precedes Sickness, and is not relieved by Vomiting, as in the Dyspeptic or Bilious Headache—Acute Hearing a premonitory Symptom—Decayed Teeth—Hard Work a common Cause—Cases in Illustration—Renal Cirrhosis a cause of Hemicrania.

Treatment—Nutritious Diet—Local and general Stimulants—Bitter Ale—Brandy and Water—Rest and Full Doses of Quinine—Carbonate of Ammonia—Chloride of Ammonium—Veratria and Aconitina Ointments—Belladonna—Arsenic—Valerianate of Zinc—Phosphorus—Strychnia—Cannabis Indica—Gelseminum—Croton—Chloral—Menthol—Iron—Cod-liver Oil—Hypodermic Injection of Morphine.

THIS is really one form of nervous headache. It affects one side of the head and face (hemicrania), or it fixes on one particular spot, causing a sensation as though a nail were being driven through the head (clavus hystericus).

It is this one-sided or unilateral character which is its great characteristic, although we must bear in mind that it is not invariable. I would limit the

strict definition of neuralgic headache to intensity of pain, to its superficial seat, to its paroxysmal character, and to its extension in the course of the superficial branches of the fifth nerve, and those filaments which supply the orbit, inner angle of the eye, and forehead.

There are certain definite and tender spots, having their origin in the fifth nerve, and in the course of its branches. Valleix called attention to this circumstance, which has been confirmed by many subsequent observers. The late Dr. Anstie, in his Lettsomian Lectures, has enumerated the most important of these painful spots:—1, the parietal point; 2, the supra-orbital; 3, the trochlear; 4, the palpebral; 5, the ocular; 6, the nasal; 7, the infra-orbital; 8, the malar; 9, the superior labal; 10, the mental; 11, the auriculo-temporal. Pressure upon any of these points, even in the intervals of the neuralgic paroxysm, will cause an exquisitely acute pain to dart along to the terminal branches, which lie external (peripheral) to the tender spot.*

Among the most frequent causes are any circumstances that depress the nervous system, and weaken the digestive functions. Neuralgic headache is one form of neuralgia, like tic-douloureux, and the paroxysm may come on after regular and short intervals of ease, or after irregular and long intervals. I have often met with it in women out-patients, who

* 'On Certain Painful Affections of the Fifth Nerve.'—*The Lancet*, 1866, p. 200.

come periodically to get relief after hard work or poor living. Any causes that induce excitement or exhaustion, as worry of mind, or severe leucorrhœa, will bring it on in subjects predisposed to it. Women drained from menorrhagia are as common victims to this variety as they are to any form of nervous headache.

Sometimes the disease is intermittent, like an attack of ague, and is traceable to the same exciting causes. From my own experience, I should say that neuralgia of malarial origin is very rare, at least in London practice. The improved dwellings of the poor throughout the country, and the better drainage of the soil, have reduced this cause very considerably. With these changes in progress, the spread of malaria and fevers of all kinds has greatly diminished. When neuralgia is present from this cause it affects the fifth nerve, or some of its branches, and the periodicity may be as regular as a quotidian or tertian ague.

Excitement of all kinds will bring on this headache, the noise of railway travelling, and any bustle or confusion. In some persons it is more frequently attributable to disordered digestion, and to changes in the weather, than to causes operating on the brain itself. It is most frequent in adult or middle life, and is far less common in children.* If it happens to those advanced in years, when degenerative changes are established, it is often severe, protracted, and

* See Chapter XV., on Neuralgic Headache in Children.

obstinate. It may be noticed that other neuralgias are equally common late in life, as sciatica, pleurodynia, angina pectoris, and gastralgia. Among women hospital patients, it is common enough when they have to contend with the cares and privations of a miserable home. Hunger and fatigue are followed by sleeplessness, and the various causes of nerve starvation invite the malady, or set light to a pre-existing local distress. Over-suckling is a most fertile cause. Women who stand for hours together over a wash-tub, or at a laundry table, are frequent victims to this form of headache. Household servants who work hard and are over-anxious to discharge their duties creditably, are sometimes great sufferers. In confirmed cases, if the general health is much impaired, the hours of labour must be diminished, or there will be no prospect of recovery; indeed, in many instances the situation has to be given up, and pure air and complete rest obtained. A north-east wind, or a cold damp day, will frequently invite an attack of neuralgic headache in those persons who are subject to it. In some patients it never fails to produce it.* The impression of cold first seizes the superficial branches of the fifth nerve, and either passes off under warmth and rest, or extends into the cranial cavity, and a true migraine is set up.

With regard to decayed teeth as a cause of this form of headache, it is important that they be not

* See Chapter VI., p. 149.

hastily removed. Many persons have had tooth after tooth extracted, and still the pain has continued. A nervous and delicate young lady, twenty years of age, having lost three teeth at the hands of a dentist, and finding the neuralgia of the head and face as bad as ever, gave up the idea of ever submitting again to a similar operation. She took quinine, arsenic, and cod-liver oil, and the pain gradually left her, notwithstanding she had many stumps and carious teeth remaining. For months together she was free from pain, but it returned from time to time when the health was lowered, and again yielded to the same measures. The source of irritation remains; it is there, but the organism only resents the irritant when the patient takes cold, or is out of health. "There are plenty of facts which suggest that lesions of nerve not necessarily painful, may become so from causes originally by no means local. Thus I believe there are hundreds of people walking about London this minute, the diseased nerves of whose carious teeth would be speedily roused into severe neuralgia by two or three nights of sleepless watching and anxiety, or by two or three days of insufficient nourishment, or of violent exhausting exertion of mind or body. And, conversely, I am sure that a generous diet will often relieve the agony arising from sheer involvement of nerves in a cancerous deposit." *

* Dr. Brinton, 'On Anomalous Intussusception of the Intestines.'
—*The Lancet*, 1863, p. 411.

In the chapter on Sympathetic Headache, I have alluded to the occasional transference of pain from the temporal to the occipital region when the teeth are unsound. Dr. Lauder-Brunton, speaking of the situation of headache dependent on decayed teeth, remarks that if a lower molar tooth is decayed it usually occasions a temporal or occipital headache, and that a decayed molar in the upper jaw causes temporal headache. When the incisors or eye-teeth are decayed, they are more likely to cause frontal or vertical headache.*

When a person is suffering from continuous neuralgia, which is apparently traceable to a solitary decayed tooth, a dentist should be at once consulted, and if stopping brings no relief, it should be extracted. These are the kind of cases in which the dentist succeeds when the physician fails. In most cases this will be found a good rule to carry out; but if there are several decayed teeth, and the patient is weak and delicate, then I should prescribe rest, good diet, and nervine tonics, and trust to the dentist's powers of arresting further decay. I have known a very troublesome headache kept up by decayed teeth, which has ceased on their being properly stopped. In January, 1887, a young lady consulted me for frontal headache, the pain being just above the eyes, so that she could not encounter light. She was of an

* 'On the Pathology and Treatment of Some Forms of Headache.'—*St. Bartholomew's Hospital Reports*, vol. xix. p. 330.

excitable, worrying nature, and the pain of toothache acted as a sufficient irritant to bring on headache. Almost any depressing cause would do the same—anything in fact that was not agreeable to her. An iron and aloetic pill with nitro-muriatic acid gave her much relief. The late Dr. Symonds, in his lectures on headache, refers to the connection between headache and decayed teeth. He very truly says that the morbid impression on the ganglionic fibres of the fifth pair may induce a morbid state of the Gasserian ganglion, whether the impression on the sensory nerves did or did not reach the sensorium, and produce a painful impression referred to the teeth. The Gasserian ganglion and the cephalic ganglion are in intimate relationship, and from the latter nerves pass to the cerebral arteries. He thinks it probable that the cephalic ganglion becomes associated with the Gasserian ganglion in its morbid condition, and hence the ganglionic nerves of the brain become very susceptible, and disposed to ache under impressions which they would not have done without this predisposition in the nerves. If this hypothesis be not correct, he thinks that the morbid impression on the dental nerves, when they arrive at the central extremities of the nerves, are passed on to that part of the sensorium in relation with the sensory fibres of the ganglionic nerves of the brain, where they maintain a morbidly sensitive condition.*

* 'On Headache.'—*Medical Times and Gazette*, 1858, p. 339.

Symptoms.—The true neuralgic headache seldom extends over the whole head, or produces sickness or vomiting, unless the attack has lasted long, or is very severe. The pain in some cases appears to enter the eye or the brow, or to pierce through the centre of the head to the occiput, and to find its escape through the neck, arms, fingers, or legs. The pain in the limbs resembles a pricking or numbness, and the patient suddenly finds, whilst engaged in writing, that he cannot hold or control his pen, and he then becomes apprehensive of paralysis. I have met with several instances of this kind. Phosphates are frequently present in the urine, but, as a rule, it is pale and copious before and during the paroxysm, sometimes becoming scanty and turbid as it is passing off. Some patients know that with these appearances of the urine they will soon obtain ease.

In this form of headache, as in the nervous variety, pain precedes vomiting, if present, and is not always relieved by it. The patient sometimes vomits incessantly, till almost torn in two by the violence of the retching, bringing up, in the first instance, some acid frothy mucus, and then, from the continued violence of the vomiting, greenish bile. This vomiting I have known go on till the patient was completely exhausted, and no relief could be obtained till the hypodermic injection of morphia was resorted to. In the vomiting of dyspeptic headache, and from indulgence in alcoholic drinks, the nausea and vomiting precede the

headache, and afford relief from removal of the cause.* In many cases free vomiting brings relief to the more acute pain. Nothing is more remarkable than the whole demeanour of the patient when the pain affects the superficial nerves of one side of the head, and when it extends into the cranial cavity, etc. Impaired motion of the affected eyelids, conjunctivitis, and excessive secretion from the lachrymal gland may all be looked for in severe cases. A lady, fifty years of age, consulted me in November, 1885, for neuralgic headache. She and her mother had suffered from bilious headache in early life. She described the pain as invariably beginning in the left eye and corresponding side of the nose ; the conjunctivæ would become injected, and both pupils dilate as though belladonna had been dropped into them. When the pain is severe in these cases the patient is restless and unable to control herself ; she wanders about the room hour after hour in great misery, feeling chilly and frequently passing large quantities of clear limpid urine.

Extreme sensibility to sound of any kind, or a distressing acuteness of hearing, is an occasional accompaniment of neuralgic headache. I am acquainted with the case of a married lady who has long been in delicate health from spinal weakness, and whose decayed teeth have partly induced the attacks of

* See the remarks on Emetics in *Nervous Headache*, p. 183 ; and *Dyspeptic Headache*, p. 120.

neuralgia in the head. When she is suffering from hemicrania she can hear the ticking of a clock in an adjoining room, in which she cannot even hear it strike when she is free from headache. The ticking of her own watch, and that of any other person in the same apartment, is quite annoying, if not almost unendurable to her. Another peculiar feature of the case is, that the patient knows when an attack of headache is threatening by her hearing becoming suddenly acute, and when the attack is likely to pass off, by a decline in its sensibility.

Whilst these pages are passing through the press, I may mention the case of a lady, fifty-four years of age, who has consulted me for severe paroxysms of neuralgic headache. The pain generally seizes the right or left temple, or both temples, and then extends across the bridge of the nose, which becomes fearfully painful. The first symptoms are a copious running from the nose, as in catarrh, and incessant sneezing for an hour before the pain. In addition to these symptoms, there is often a patch of redness on the right or left cheek. In the preceding chapter I have mentioned some peculiar symptoms which announce an approaching nervous headache.*

M. A. S., æt. 32, single, a female servant, and a resident in London, consulted me May 22, 1877. She had been subject to sick headache all her life, but had become much worse during the last nine months,

* See pp. 150, 151.

which she attributed to hard work and fatigue ; extra work increased the pain, and going upstairs tired her exceedingly. The house in which she resided had been much altered in its arrangements, and this vexed and worried her.

History and Present Condition.—The patient was thin and weak, and bore all the evidences of a nervous temperament. Never had any illness except indigestion two years before, which lasted six weeks. Catamenia regular, but scanty ; slight leucorrhœa ; bowels regular ; appetite capricious, sometimes ravenous ; had slept badly of late. Her mother suffered periodically from headache.

The patient's early headaches were always relieved by sleep, and if she could get a nap she was certain to be better, or if she went to bed a good night's rest would set her up. Now she could not trust herself to go out anywhere, and she was afraid of returning with the pain. She felt very low-spirited with it, but not hysterical, and was inclined to shut herself up, and keep quiet.

Character of Headache.—The situation of the pain was entirely unilateral ; it began over the right eye, above the brow, as a heavy pressure, which worked through the centre of the right half of the brain to the occiput (one half of head) ; the neck became stiff, and there was difficulty in rotating the head ; then the pain extended down the right arm to the fingers of the same side, which felt stiff, and the right leg was

weak, as if asleep. She was very flushed when the pain was on her; the right eye was red, injected, and watery, and the lower eyelid was rather puffed and quivering. Sometimes she felt irritable before the pain came on, and nothing went right. The impulse of the heart against the sternum was weak, sudden, and short, and the first sound was rather blowing, as in anæmic states of the blood: the least excitement caused palpitation and discomfort over the præcordial region, while she experienced a feeling of breathlessness and anxiety; the pulse was weak and tremulous, and the hands and feet were inclined to be cold.

She was ordered cocoa instead of tea, and to take as much milk as she could digest. White fish, fowl, and mutton were to be the chief forms of food; pastry and stimulants were rigorously forbidden. In the shape of medicine, ten grains of the pil. aloes et assafœtid. were prescribed at bed-time occasionally. Bromide of potassium and ammonium when the attacks of headache threatened (Form. 26), and a mixture of iron and arsenic twice a day (Form. 24 b).

May 29. On the two days following her visit she had severe headache, but three days later she had been easier, and had slept better; the right eyelid was puffed to-day, and there was pain over the orbit, from the corner of the nose to the temple of the same side. She had some difficulty in walking up and down stairs: both the right leg and right hand were

cold, stiff, painful, and rather swelled, but she was on the whole better, though nervous about her state.

August 2. The queer sensation in her right hand and leg had departed for three weeks, and she had had no headache whatever for five weeks. She could take a long walk without fatigue, and looked quite well. She had taken the arsenic and iron mixture twice a day since it was prescribed, and a pill occasionally. The right eye was still puffed, and pain would always bring on this œdematous condition.

In September the patient had gained flesh and strength, and there was no return of the headache. She was in all respects well, and the recovery was due to her better condition and improved quality of blood.

A lady, fifty years of age, came under my care in November, 1885, with some unusual symptoms. She was a thin, spare woman, who had had a worrying, anxious life. She had been always delicate, and from girlhood had suffered from "bilious headaches," like her mother had done before her, accompanied by vomiting. From fourteen to sixteen years of age she experienced a numbness down the left side of the trunk, and left side of the tongue, and she only saw the half of anything and anybody. The attacks commence with irritability and restlessness; the pain begins in the left eye and side of the nose, both pupils become dilated, as though belladonna had been dropped into them, the conjunctivæ are injected, and

there is lachrymation. In this patient, headache recurs every three weeks to the day, if the weather be cold; but in warm weather she is free for months together. Port wine gives relief, brandy increases the pain. Among medicines, chloride of ammonium and calumba suit best, with an aloetic pill. Citrate of caffeine in effervescence sometimes does good. In another case, a lady, forty-six years of age, has a hard and dry cough preceding the headache, and passes a large quantity of pale urine. The attacks nearly always begin in the night. She wakes up between two and three o'clock in the morning, in a violent perspiration, and with a feeling of great discomfort, sometimes in the back of the head, and sometimes between the eyes, the pain generally settling in one eye. At seven a.m. the vomiting begins, and from the violence of the retching she brings up bile. No relief comes till there is vomiting. Quinine in any dose or form causes a buzzing in the ears and general excitement, making the head feel hot. Bromo-caffeine by checking sickness increases the headache. The bromide of potassium, sodium, and ammonium with belladonna subdue the severity of the pain. Under this treatment the headaches have become much less frequent and severe.

Neuralgia points to a lowered state of vitality in the track of a nerve, and to combat this, nutrition must be improved. The late Dr. Anstie experienced severe attacks of neuralgia of the brow from child-

hood, entirely independent of digestive derangement.* The pain was always on the right side only, and followed the course of those branches of the fifth nerve which are distributed to the forehead, the internal angle of the eye and the nose; more rarely extending also to the branches derived from the second division of the fifth nerve, and distributed to the cheek. This kind of headache began at the age of fourteen, and for three years was of frequent occurrence. The attacks of pain were invariably preceded and accompanied by pallor of the face, weak pulse, and a general sense of depression. Ammonia and hot tea were the most useful remedies. Occasionally quinine in a full dose, or a glass of wine was of value.†

The condition of the renal organs has much to do with headache, and I have seen very persistent forms of it when the kidneys have sustained mischief from scarlet fever and desquamative nephritis.‡ The cases I have generally observed have been marked by continuous frontal headache, heavy and oppressive, less at one time than at another, but rarely if ever completely absent for a single moment. Dr. Barthels has witnessed severe hemicrania in connection with

* A neuralgic headache is sometimes aggravated, if not caused, by gastric irritation and acidity. A teaspoonful of bicarbonate of potash in a wineglassful of water will liberate carbonic acid in the stomach, and speedily remove the pain.

† *On Stimulants and Narcotics*, p. 83.

‡ See Chapter IX.

Renal Cirrhosis, and I shall therefore quote his own words on the subject. "In other cases, the first evidence of the disease consists in frequent and severe *attacks of headache*, sometimes occurring under the form of excessively severe *hemicrania* of remarkably long duration; indeed, I have observed this form a number of times. The pain, too, may extend down the neck, and even to the brachial plexus of the affected side. Such paroxysms may last for several days. In one case of this kind I noticed almost complete anæsthesia of the skin of the face, and of the fingers upon the affected side during the continuance of the attack. This patient had an attack of the kind nearly every week; and, finally, during the intermissions, normal sensation did not quite return to the face or fingers, but a feeling of numbness and formication remained."

"In any case of migraine occurring after middle life in an apparently robust individual, it is well to consider the possibility of the nerve affection being dependent upon contracting kidneys. Neuralgic pains in the track of other nerves have, in my own experience, proved far less common than headache, so that I am still doubtful whether I can properly connect these isolated attacks of neuralgia with this real disease as cause and effect." *

Treatment.—The subjects of this variety of head-

* *Cyclopædia of Medicine*, by Dr. H. von Ziemessen, 'Diseases of Kidneys,' vol. xv. p. 421.

ache being usually anæmic, the first indications are to improve the general condition by nutritious diet, and enforcing mental and bodily rest. I have known a full dose of brandy and water give almost immediate relief when the attack was limited to one side of the head and face. A lady, who was under my care some years ago, was able to ward off a neuralgic headache, which came on late at night, by taking a slice of bread and butter, and a glass of Bass's ale, or good bitter beer, before getting into bed. A local stimulant of chloroform and aconite liniment will sometimes give ease after friction for a few minutes. A little extract of belladonna rubbed into the affected temple will be useful in some cases (Form. 110), and an ointment of aconitina (Form. 113) or of veratria (Form. 111) will prove efficacious in some obstinate cases.* Internally, the carbonate of ammonia will sometimes be of service (Form. 16). The chloride of ammonium is another good remedy in these cases, particularly if the pain extends to the face (facial neuralgia). It should be given in \mathfrak{v} j or \mathfrak{z} ss doses (Form. 27), and if no relief follow the administration of three or four doses, it is not well to continue it. It diminishes congestion of the vessels, and promotes cutaneous action and diaphoresis.

* The *Birmingham Medical Review*, quoting from the *Canada Lancet*, says, that local anæsthesia may be produced by applying with a camel's hair brush the following mixture :—Hydrate of chloral and camphor, of each one drachm ; sulphate of morphia, half a drachm ; chloroform, one drachm.—August, 1885, p. 96.

Trousseau speaks highly of belladonna or atropia applied locally in superficial neuralgias of the temples, forehead, or scalp. He recommends compresses to be steeped in a solution * and applied to the painful parts under oil-silk, so as to prevent evaporation; the whole to be kept on with a bandage. The application is to be renewed several times in the twenty-four hours, and continued for an hour each time; indeed, continuously if there is no relief to the pain. As Trousseau points out, the remedy varies in different individuals, and therefore the dose must be increased or diminished accordingly. If the neuralgia is very limited in its area, a more concentrated solution of atropia may be used (gr.iii. to ʒss.), with the addition of a small quantity of alcohol. A few drops should be rubbed into the painful part with the finger.† As a substitute for the atropia he also recommends the extract of *Datura Stramonium*, and of belladonna, mixed with glycerine and starch, in the proportion of one-third or one-fourth. This forms a paste of the consistency of an ointment. A little is to be spread on lint, and applied under oil-silk.‡

Belladonna is said to possess great efficacy in neuralgia of the fifth nerve. Trousseau administered one-fifth of a grain every hour till giddiness was produced,

* R. Atropiæ Sulphat. gr.v.
Aquæ destill. ʒiii.
Misce.

† *Lectures on Clinical Medicine, New Syd. Soc.*, 1867, vol. i. p. 496.

‡ *Ibid.*, p. 497.

and then lessened the dose, and continued the medicine for several days. It is most important to begin with a small dose, as one grain of the extract may produce toxic symptoms (see page 42). According to Ringer, belladonna is useful when the pain is situated over the brows, and in the eyeballs, which seem too large for the head, and as if they would be forced out of the skull. This form of headache is not traceable to stomach or uterine derangement, but to weakness and overwork. He recommends three minims of the tincture to be given every hour.* In cases of this kind, when at all severe, I have found that perfect rest in bed, in a quiet and darkened room, is an essential part of the treatment. Bromide of potassium with carbonate of ammonia in effervescence (Form. 25 *a*), or a dose of bromo-caffeine will calm the patient, and frequently invite sleep. If the pain enables the patient to keep about, belladonna may succeed, but I have often been disappointed with its action.

The hypophosphite of soda in infusion of calumba (Form. 28) is a good remedy, or the hypophosphoric acid may be given in combination with quinine, strychnia, and iron (Form. 21-22-22 *a*-23).

Arsenic, about which I shall have to say more in another chapter, is a valuable therapeutic agent in this variety of headache, characterised as it is by paroxysmal pain, chiefly unilateral, and extending in the course of one or more of the three divisions of the

* *Handbook of Therapeutics*, 11th Edit., pp. 519, 520.

fifth nerve. It is a powerful alterative and tonic, and when given judiciously it acts favourably on the blood and nervous system. I have frequently known such headaches yield to arsenic when steadily continued, in diminishing doses, as Mr. Hunt recommended many years ago, after its physiological effects are produced. The liquor arsenicalis, freely diluted, is the best preparation to employ (Form. 8-9) but granules of arsenious acid (gr. $\frac{1}{66}$), prepared by Corbyn and Co., are both useful and convenient.*

Dr. Begbie states that he has witnessed the postponement and ultimate cessation of a periodic headache through the influence of arsenic, before the pricking eyelid or silvered tongue demonstrated its agency.†

When we are disappointed with the effects of arsenic, there is often a taint of gout, or syphilis, or mercury. "We are called to one labouring under excruciating headache, which attacks him at an early hour in the day, and regularly takes its departure in the afternoon. Day after day the attack is renewed, and the same hours witness the return and departure of the paroxysm. It has defied all ordinary methods of treating headache; the physician has pronounced it brow ague, and has promised that it shall yield to quinine or bebeerine. He is disappointed; it has resisted both; he betakes himself to Fowler's solution,

* See the action of arsenic in Chapter IX., p. 274.

† *On the Physiological and Therapeutical Effects of Arsenic*, 1862, p. 272.

and after two or three days the attack is postponed, or it comes in a less severe form. We try a combination of arsenic and quinine, and in a short time the wished-for cure is obtained." *

It is well to bear in mind that neuralgic headache sometimes occurs in plethoric-looking persons; but they have not the blood belonging to this condition, and the florid countenance is more strictly due to relaxation and debility of the capillary circulation. In subjects of this kind, I have found a mixture of sulphate of magnesia and quinine useful, till the liver and portal circulation have been drained (Form. 29). After this, full doses of quinine, and a little brandy and water during the day, have aided the cure. Such persons have gone on comfortably for weeks and months, notwithstanding inattention to decayed teeth, and a drain from the system of various kinds.

When the subjects are excitable and hysterical, and the pain is persistent, bromide of ammonium or potassium with valerian will be advisable (Form. 72), and if anæmia is a marked symptom, iron with quinine (Form. 20 to 24), or valerianate of zinc and a stomachic (Form. 87); phosphorus and small doses of strychnia, if the nervous system is harassed by mental toil and anxiety (Form. 88-89). If there is sleeplessness, a pill of camphor, henbane, and cannabis indica (Form. 92-93) will be found of service, and it will have a

* *On the Physiological and Therapeutical Effects of Arsenic*, 1862, p. 276.

most tranquillizing effect ; but all drugs will fail to remove the pain, unless air, exercise, rest, and good food be prescribed.*

Gelsemium sempervirens (yellow jasmine) has been employed successfully in neuralgic affections, and the neuralgia arising from decayed teeth. In hemicrania and supraorbital neuralgia it has been found exceedingly useful, but at present it is impossible to say what those cases are which will be most benefited by it. The powder and the tincture are the two forms for administration ; the dose of the former is from one to two grains, and of the latter from ten to twenty minims. Ten minims taken for facial neuralgia, followed in half an hour by a repetition of the same dose, produced in fifteen minutes drowsiness, frontal headache, shivering, and dizziness. No neuralgia. The pulse was weak and intermittent, the pupils were contracted, and there was a feeling of collapse. Vomiting followed a cup of tea. Then a glass of strong brandy and water was taken, and repeated in half an hour. In two hours the patient was well, and the neuralgia had not returned next day.†

The alkaloid gelsemina may be given in the form of pill with spirit and glycerine (gr. $\frac{1}{80}$ to gr. $\frac{1}{20}$), or the alcoholic extract of gelsemin (gr. $\frac{1}{2}$ to gr. 2) in a pill similarly prepared. It is most important to dis-

* See the remarks on *Cannabis Indica* at p. 187.

† *British Medical Journal*, 1881, vol. i. p. 193.

tinguish it from the former.* In some cases I have found that one grain of the powder made into a pill with glycerine and given every night at bed-time acts marvellously well, inducing sleep, and warding off a paroxysm if taken as the seizure is threatening. Three grains of croton-chloral with $\frac{1}{200}$ grain of hydrochlorate of gelsemina is an excellent remedy in facial neuralgia (Form. 105a). In large doses the drug appears to cause frontal headache, contraction of the pupils and weakness of the legs.† From the observations of M. Emery-Heroguelle it acts favourably as an anti-neuralgic, in neuralgia of the fifth pair, dental neuralgia, the brachial plexus and intercostal nerves.‡

Croton-chloral has been recommended by Dr. Liebrich of Berlin as possessing a special action on the sensory branches of the fifth nerve. It is of most benefit in facial neuralgia, relieving pain and producing sleep. It does not lower the pulse like hydrate of chloral. I have known it prove very serviceable in some cases of nervous headache in which the disorder has chiefly occupied one temple, the occiput, and neck, or one parietal bone, and in other cases not only to utterly fail, but to induce sickness and nausea, where they did not previously exist. I generally give gr.x.

* See *The Extra Pharmacopæia*, by Martindale and Westcott, 1885, p. 192.

† "A girl nine years old was killed in two hours by a dose of two drachms of the tincture."—*Squire's Pharmacopæia*, 11th edition, 1887, p. 148.

‡ *Medical Examiner*, December 27, 1877, p. 1067.

for a dose in plain water, though it has been advised to dissolve the remedy in a few drops of glycerine, and then add the required quantity of cinnamon water, which to some extent disguises the bitter nauseous taste. On this account it may be given in the form of a pill, beginning with two grains, and increasing the dose according to the urgency of the symptoms.

Croton-chloral in doses of three grains, and gr. $\frac{1}{200}$ of hydrochlorate of gelsemina, made into a pill with mucilage, is a most efficacious remedy in facial neuralgia, given every hour until relief is obtained.

Sometimes terrible neuralgia over one eye and side of the face follows immediately on a diffused nervous headache. There has been sickness and prostration. A teaspoonful of brandy in a little soda-water, and quinine with spirit of chloroform (Form. 12), have been retained on the stomach, and the pain has gradually departed. Twenty grains of bromide of potassium in a wine-glassful of water will sometimes have the same beneficial effect.

When the neuralgic pain is localised over one temple or brow, it may often be relieved by rubbing in the menthol cone, or, what is very useful, by applying a menthol wafer, or plaster, which adheres to the skin. One of these wafers may be cut into two or more portions.*

* These are made by Burroughes, Welcome, & Co., and may be obtained of any chemist.

A middle-aged lady, under my care in 1879, derived great benefit, and repeatedly warded off an attack of neuralgic headache, by taking, as soon as she awoke in the morning, one or two teaspoonfuls of tincture of quinine in a small cup of milk. Another patient found the attacks lessened in frequency and severity by taking a glass of Dublin stout at luncheon and dinner.

In the intervals of the headache remedies must be employed for improving the quality of the blood, and restoring the general health. Quinine and arsenic together are very valuable remedies (Form. 8-9), and so are cod-liver oil and fatty matters in restoring the wasted nervous tissues.

But what is to be done when the patient is worn out with agony, and can obtain no rest by day or night? It is idle to talk of rubbing in menthol or aconite, or any other local application, or of taking internally, any known drug. All these remedies are doomed to failure. In such cases as these we are justified in having recourse to the hypodermic injection of morphine, and if performed carefully, according to the rules already laid down, there is no risk or danger. It is the only remedy that affords any chance of relief. The peacefulness and calm that follow it are truly wonderful. The patient quickly rallies from the moment it is used, warmth returns to the surface, and the pulse improves. I am not, of course, advocating its use except in very severe cases,

which have bid defiance to the usual remedies. The relief it affords has, unfortunately, driven many persons to have recourse to it so often as to gradually bring them into a very weak and exhausted state.*

* The hypodermic action of morphine is fully considered in Chapter VI., p. 199.

CHAPTER VIII.

NERVO-HYPERÆMIC HEADACHE.

Condition of the Cerebral Vessels, and Diagnosis from Nervous Headache—Most common in Men who indulge in Stimulants, and whose Brain is overworked at the same Time—Symptoms indicate Nervous Exhaustion, with Depression of Spirits and Loss of Appetite—Excitability of Manner and Annoyance from Trivial Causes—Frequently met with in Young Persons of both Sexes—Use of an Emetic—Aperients—Alkalies—Occasional Utility of Opium—Bromide of Potassium and Chloral.

I INTEND by this term to imply a form of headache in which the nervous element is concerned, and the vessels of the brain are overloaded and in a state of vascular irritation. It is by far the most common form of congestion, and fully one-half the cases that seek relief are to be classified under this head; at least, this holds good with male subjects. At one stage or another the nervous headache indicates that the vessels of the brain are congested, because it is liable to paroxysms of severity from any excitement or noise, hot rooms, or eating and drinking. There is not the same amount of prostration and helplessness, which are striking features of the nervous

headache. It belongs to persons whose circulation is excitable, and to those who are impulsive and undisciplined, or who, from the force of circumstances, have no alternative but to work on and abide the consequences. It is met with in men whose brains are overworked, and whose meals are hurriedly taken, especially if at the same time they indulge freely in wine and spirits, and do not get a full allowance of sleep. These persons are liable to flatulence ; they have a coated tongue in the morning, and a dry unpleasant taste in the mouth ; the breath is hot and offensive, and there is thirst and a total loss of appetite. Such persons go on working against time with an ardour and zeal which they feel to be irresistible. They appear to know that the speed with which they are carried along is detrimental, and that soon they must yield in the contest ; and yet, unless they give up work altogether, they have no power of moderation. Control is gone. This condition of the brain makes men really nervous ; if they can be convinced of the mischief that may come, they slacken the speed for a time, and in some instances, when they find the weight of the symptoms pressing upon them, the reckless fortitude is abandoned for complete surrender, and the whole aspect of the man's manner and life is changed.

With this exhaustion, and partial or general congestion of the brain, there is great nervousness, with lowness of spirits and depression. The appetite,

however, in many cases is natural, and the sleep may be good, or, what is more common, the patient feels inclined to sleep after dinner, but when he gets to bed is wakeful and restless, turning about from side to side ; his mind is busy with strange ideas, or he is morbidly solicitous about himself or others. Then in the morning he wakes unrefreshed and eats his breakfast in a hurry. If he is vexed or annoyed, he can scarcely prevent himself from going into great passion and rage. He feels a rush of blood to the head, and a passing sensation of momentary unconsciousness. His scalp is hot, the capillaries of the face are injected, and the eyelids wearied and tremulous. For the rest of the day (and for some time afterwards it may be) his legs and knees feel as if they would give way under him, and he does not walk securely. If he has been in the habit of riding, he has no confidence in the saddle, and any sudden movement of the horse drives the blood to the face and head. Such a patient as this may pass an excessive quantity of uric acid in the urine, especially if he is of gouty or rheumatic diathesis ; but it more frequently happens that the urine is copious and clear, of acid reaction, and of low specific gravity. In one patient, whose case chiefly furnished these remarks, the urine contained a copious quantity of phosphates, when the headache and nervousness were severe ; and I never noted their absence with this state of the head.

A good example of this headache is also seen in women at the change of life, whose constitution till

this time has been sound and good, and the mind properly balanced. The catamenia have been regular up to the age of forty-five or thereabouts, and then somewhat suddenly they have become sluggish, or irregular and scanty. At each returning period there has been headache across the forehead, and weight over the eyes. The patient complains of flushes of heat, and the head and scalp are hot. Any allusion to her condition drives the blood to her cheeks, and a dry skin is succeeded by a hot oppressive perspiration, with faintness and languor. She sleeps badly, and sees dark spots before her eyes; she cannot concentrate her attention on her household duties; and her children vex her, and easily put her out. She is made jealous and excitable without reason, and magnifies into questions of great moment trifling circumstances, to which at other times she would not pay any attention.

There are many cases of mixed headache, happening to young persons of both sexes, and due as much to cerebral hyperæmia as to nervous disturbance. The cheeks are flushed, the eyes suffused, and the patient is compelled to lie down and discontinue the duties of the day. The symptoms cannot be attributed to a gastric origin, for the tongue is clean, the pulse is quiet, and there is no indigestion. Here the vasomotor system is at fault, and the cerebral vessels are relaxed. Remedies like strychnia and gentian, the mineral acids, and iron (Form. 47-53) are more service-

able than depletion, which, by weakening the nerve force, would further increase the excitability of the cerebral tissue. A careful discrimination of these cases, which may well baffle a shrewd observer, is very necessary, and successful treatment depends on a correct diagnosis.

As regards treatment, a mercurial pill, followed by an effervescing aperient saline, will often cut short the attack (Form. 18-81-61). Three grains of blue pill, when the headache is threatening, will sometimes get rid of the misery in a few hours; and the fixed alkalies, as bicarbonate of soda or bicarbonate of potash, will also be of service, by relieving the acidity of the bowels. It is a good plan to get the bowels to act promptly, and this may be promoted by soap and water enemata. Where there is much throbbing of the temporal arteries, and the patient feels nausea on turning round, or going into a warm room, an emetic of ipecacuanha or sulphate of zinc (Form. 108-109) will act in a marvellous manner; and even if there is no food in the stomach, the effort of vomiting will empty it of an acid, irritating mucus, already referred to. It also relieves congestion of the liver and duodenum, and so the headache departs. Apomorphine, injected subcutaneously, in a dose of gr. $\frac{1}{20}$ and upwards, is a most speedy emetic. In this class of cases, where there is hot burning headache, with cold hands, and feet, depressants of the circulation are valuable remedies; and among them aconite (Form. 106) may

be selected, from its power of dilating the contracted vessels of the extremities.

During the acute attacks we are powerless to do more than this; and when they pass away and the patient resumes his ordinary habits, he feels as well as at any time of his life. In cases where the headache lingers, or returns from slight excitement or fatigue, the ordinary treatment should consist of bromide of potassium with laxatives, or a bitter stomachic twice a day (Form. 68); and if there be acidity and flatulence, the subcarbonate of bismuth, in full doses, half an hour before meals (Form. 107), will be found of value. I have often seen great benefit derived from bromide of potassium or ammonium, with small doses of sal volatile, taken on first getting out of bed. As a sedative at night, where the patient rests badly, bromide of potassium, alone (Form. 40) or in combination with hydrate of chloral, is the best (Form. 67). I do not think opium should be ventured on in these cases, particularly if the pulse is at all hard or incompressible; but where it is soft, and of average frequency, I have known a few drops of nepenthe (Form. 69) given with bromide of potassium, or hydrate of chloral, tranquillize the patient and promote refreshing sleep. As long as the headache persists, a non-nitrogenous diet and abstinence from stimulants ought to be observed.

I knew an unmarried lady, thirty years of age, who thought she would lose her senses if she did

not take a full dose of chloral (Form. 70) when the headache was severe. It relieved the pain quickly, and on comparing this case with that of a patient (much her senior in years) who got relief from the hypodermic injection of morphine, I found the effects of the two agents very similar in the comfort and undisturbed sleep that ensued. But the two headaches are due to different pathological conditions—in the one, the maddening pain is as much owing to increased vascularity of the contents of the encephalon, as to a morbid excitability of the nerve centres; in the other, the nervous system is primarily and chiefly at fault, and hydrate of chloral would further rob the brain of its defective blood supply. The action of chloral is not always to be explained in these complicated cases. A young person who enjoys good health in the intervals of the attacks of headache suffers no continued inconvenience from an occasional dose. The system soon rallies from any depression it might induce; but persons should be warned not to fly too frequently to this nerve depressant, nor to take it at random without regard to preventive treatment in the intervals of suffering. Chloral is taken for all kinds of headache by many, who get relief in the stupor and drowsiness which follow. Although they may take it from time to time, without experiencing any immediate ill effects, they are nevertheless likely to injure their nervous tissue by too frequently resorting to it. The action of chloral is double: in the first place, it acts directly

upon the nerve tissues themselves, lowering their activity ; in the second place, it depresses the circulation and the respiration. Chloral kills by paralyzing the respiration and the circulation (H. C. Wood). In non-lethal doses, chloral by its double action produces chronic starvation of the brain tissues ; not only that, but there is also danger in its continued use, as not rarely, under these circumstances, a fatal result has followed from depression of the circulation and respiration produced by the ordinary doses. The condition of the brain becomes more and more debilitated under frequent resort to it, and the excitement gives place to a state of mental lethargy and inaptitude, accompanied by irritability, which lays the foundation of perverted nutrition, and such changes in the nerve centres as in the long run encourage serious effusion, and the waste of brain structure. In those cases where chloral furnishes great relief during the acute attack, it is well to give nervine tonics during the intervals by means of quinine, strychnia, phosphorus, and iron (Form. 14-21-24). Taken regularly at these times, the nutrition of the brain tissues is improved, and the attacks are rendered less frequent and less severe. Such treatment during the interval is in no way incompatible with the use of chloral during the acute attack.

CHAPTER IX.

TOXÆMIC HEADACHE.

Headache of Fever owing to the Action of Poisoned Blood on the Nerve Centres—Character of Headache in Acute Fevers—Relapsing—Typhus—Simple continued—Enteric—Whooping-Cough—Measles—Scarlet Fever—Variola—Malarial Poisoning—Uræmic Headache—Albuminuria—Headache from Gas-Poisoning—Symptoms—Treatment—"Body-snatchers' Headache"—Local Abstraction of Blood—Leeches—Cold Affusion to the Scalp—Ice-Cap—Quinine—Ammonia—Opium—Treatment of Headache from Albuminuria—Diuretics—Diaphoretics—Chloride of Ammonium—Case of Headache from Malarial Poisoning—Arsenic and its Constitutional Effects in continued Doses—Phosphorus—Caffeine—Tabloids—Cod-liver Oil—Fish as an Article of Diet.

It will be well in the first place to consider under this category the headache of fever, which I have elsewhere termed febrile headache.* The pain is attributable to an alteration in the constitution of the blood and its component parts; this causes a morbid sensibility of the nerve centres, and induces congestion of the vessels and membranes of the brain. When absorption of the fever poison into the system has taken place, every tissue through which

* See *Diseases of Children*, and Chapter XV.

the blood passes is impressed by it, and one of the most constant indications of its pernicious effects is headache. Headache is present in the simple fever of common catarrh, when the frontal sinuses are congested, and the lachrymal glands pour out an abundant secretion. It is a striking symptom in influenza and frequently recurring colds, when there is prostration of the strength, and the nervous power is reduced. The sudden impression of cold or atmospheric poison may exert an influence on the fifth nerve, at its origin in the brain, through the branches of the ophthalmic nerve, springing from the Gasserian ganglion. In the chapter on Sympathetic Headache, I have already alluded to this extensive nerve communication, along which morbid impressions are so readily conveyed.

In acute fevers headache is rarely absent. With respect to its relative frequency, Dr. Murchison has noted that, of ninety-two cases of typhus, headache was complained of in all but six. Dr. Henderson found it in 150 out of 159, and Dr. Stewart in a large number of cases.* The pain generally occupies the forehead and temples: it is of a dull heavy character, and is attended with giddiness and confusion of ideas. In young and strong children the pain is intense, and frequently forms the most prominent and leading feature of the disease. When it is acute and distressing, it is often associated with great restlessness,

* Murchison, *On Continued Fevers*, 1862, p. 150.

flushing of the countenance, and injection of the conjunctival vessels. If this state is overlooked or neglected, it may lead to delirium and profound somnolence, from which the patient cannot be roused.

In relapsing fever, headache is a common and early symptom, and is more darting and throbbing than in typhus.* In typhoid fever, headache is also a frequent symptom, both in adults and children. Dr. Murchison ascertained that it existed in seventy-seven out of eighty-two cases, and M. Louis in all but seven out of 133 cases.† The pain resembles the headache of typhus in its dull continuous character, and in its usual limitation to the forehead; but the mental faculties are rarely impaired, and delirium is exceptional. In simple continued fever, and that variety known as ephemera, headache is more or less present; and in some forms of the same disease, where the duration of the fever is longer and more intense, it is relatively more acute than in either typhus or enteric fever.‡ The poison of malaria gives rise to a severe type of headache, either anteriorly (frontal), posteriorly (occipital), or on either side (hemicrania). We meet with headache, again, in whooping-cough and scarlatina, in variola, measles, etc.; in fact, in all those diseases in which a toxæmic condition of the blood exists. Headache is also frequently found in some acute local inflammations, as pneumonia and peri-

* Murchison, *op. cit.*, p. 345.

† Ibid., p. 487.

‡ Ibid., p. 600.

carditis, and the treatment should be determined by these respective lesions.

There is no specific febrile or inflammatory disorder which does not create some morbid impression on the brain, and in many instances, as we have seen, the cerebral cells become irritated and disturbed, till the inflammatory affection passes away.*

* It does not appear that the intensity of the cerebral symptoms in typhoid fever in adults, or in cerebral congestion and tubercular meningitis in children, bear any relation to the morbid appearances found after death. In some fatal cases, when the head symptoms have been trivial, extreme vascularity of the membranes has been discovered, and the vessels and sinuses of the brain have been gorged with dark blood; whilst in other cases, when the head symptoms have been severe, and there has been delirium and even convulsions in children, no sign of inflammation could be detected, but considerable effusion of serous fluid into the lateral ventricles and beneath the arachnoid. A large quantity of intra-cranial fluid, in fact, is not infrequent in typhoid, and as regards the substance of the brain itself, it is more frequently found normal than otherwise. In typhus fever the same rule obtains, viz. that in the absence of severe cerebral symptoms during life, abnormal vascularity of the membranes of the brain may be detected after death. In both these diseases the cerebral congestion is not greater than may be found to exist in cases of severe pneumonia or bronchitis, or any disease which has impeded the pulmonary circulation. There is no sign of inflammation, and the congestion is of a passive rather than of an active character. The transparent and often colourless serum which is found in the ventricles, and beneath the arachnoid, is rather more common among the morbid appearances in typhus than it is in typhoid. A few albuminous flakes are occasionally present in both diseases, but there is no genuine lymph or exudation corpuscles in either—no products we can term inflammatory. The subarachnoidean serosity and the fluid between the convolutions and the sulci are well marked, and this large amount of fluid, although not indicating any inflammation, does assist in explaining the severity of the cerebral symptoms during life. In young children of rickety constitution, when the head is growing unusually large, the convulsions and comatose condition have,

I might reasonably have included the headaches of gout, rheumatism, and syphilis under this name, seeing that the accumulation of morbid products in the blood impairs the nutrition of the nervous tissue, and originates pain and suffering; but although these headaches are secondary to the constitutional state which calls them forth, I think a separate classification is advisable for the varieties depending on the special affections to which I have alluded.

A form of headache due to toxæmic change (*uræmic headache*) now and then occurs in connection with disease of the kidneys, when their secreting tissues are impaired, and they are no longer able to

in my experience, borne a close relation to this excessive secretion of fluid. Yet most physicians will declare that, when the amount of fluid is trifling, the cerebral symptoms are as great as when the quantity is excessive. The symptoms are chiefly attributable to the altered quality of the blood, and the elevation of its temperature in the cerebral vessels. In relapsing fever the same remarks apply without any exception: there is no constant relation between the cerebral symptoms and the state of the brain and its vessels. The vascularity of the membranes and the serosity in the ventricles do not in any way explain the head symptoms during life, and there is no proof whatever that the brain or its membranes are liable to be inflamed in consequence of the fever process. The inference is that the headache of fever is essentially dependent on the presence of the specific poison in the blood, and the accumulation in it also of the products of tissue change, which are not eliminated by the proper channels. The nutrition of the brain suffers in consequence of this detention, notwithstanding the wide difference in the nature of the respective fever poisons. Hence it is that the nervous system generally becomes oppressed, and the sympathetic partially paralyzed.

As a matter of clinical experience, I am informed by Dr. Broadbent that protracted headache in the early stages of enteric fever denotes unusually severe affection of Peyer's patches, and is often followed by hæmorrhage at a later period.

separate the excrementitious matters from the blood. They may act energetically for a time, but at length the morbid material in the blood ceases to exert a diuretic influence, and degeneration in their structure takes place. In a little girl, aged ten years, who came under my care in 1875, with acute desquamative nephritis and anasarca, the headache was most inveterate, occupying the entire forehead, and continuing for days together. When the local congestion had subsided, and the urinary secretion had increased in quantity, she obtained relief; but if any animal food was taken, even in the shape of beef-tea, it renewed the headache by still further impairing the functions of the eliminative organs, and causing on two or three occasions severe hæmaturia. Active aperients from time to time, and a diet consisting exclusively of milk, were the chief remedies trusted to. In the case of a man, sixty-four years of age, who came under my care in 1864, with chronic Bright's disease, the frontal headache was almost insupportable, and lasted, without intermission, from the day of its commencement to his death—a period of many months. The slow accumulation of urea in the blood (uræmic poisoning), from gradual degeneration in the kidneys, rendered all attempts at relief abortive. The most restricted and careful diet, with purgatives and stimulating diaphoretics, only produced temporary benefit. Where the cause cannot be removed there is little to be gained from any plan of treatment. When he

became anæmic, a few drops of the tincture of the perchloride of iron were tried; but no relief was obtained, because the blood became more and more contaminated, in consequence of the increasing destruction in the secreting apparatus of the kidneys and the absorption of the urinary ingredients. As usually happens in these cases, drowsiness and stupor came on, and the patient died comatose from uræmic poisoning.

It is evident, from all that has been said, that headache is a universal symptom in cases of blood-poisoning, from whatever cause arising. It is common in all acute diseases, and wherever the blood is contaminated. A short time ago Dr. George Johnson called attention to the liability of the kidneys to take on diseased action from septicæmia, the result of insanitary conditions and defective drainage. He has met with several cases of incurable disorganization of the kidneys from continued exposure to sewer-poison. As he truly observes, the albuminuria like the diarrhœa, which was also present in some of the cases recorded, was a physiological effort on the part of the bowel and the kidney to eject the noxious products from the system.*

I cannot dismiss this character of headache without considering the effect which toxic agents have on the blood and nervous system, when the atmosphere is

* 'Albuminuria, a Frequent Result of Sewage-Poisoning.'—*Brit. Med. Jour.*, March 3, 1888, p. 437.

vitiated by crowded assemblies or the imperfect ventilation of apartments. I believe that the accumulation of carbonic acid and expired air in school and lecture rooms is to be reckoned among the chief exciting causes of headache in young persons, and still more in adults when the nervous system becomes more susceptible with the advance of years.

"The normal quantity of carbonic acid being 4 volumes per 1000, it produces fatal results when the amount reaches from 50 to 100 per 1000 volumes; and, at an amount much below this, 15 or 20 per 1000, it produces, in some persons at any rate, severe headache. Other persons can inhale, for a brief period, considerable quantities of carbonic acid without injury; and animals can be kept for a long time in an atmosphere highly charged with it, provided the amount of oxygen be also increased. In the air of respiration, headache and vertigo are produced when the amount of carbonic acid is not more than 1.5 to 3 volumes per 1000; but then organic matters, and possibly other gases, are present in the air, and the amount of oxygen is also lessened. Well-sinkers, when not actually disabled from continuing their work by carbonic acid, are often affected by headache, sickness, and loss of appetite; but the amount of carbonic acid has never been determined."*

Facts like these attest the danger of continually breathing an atmosphere vitiated and overcharged

* *Practical Hygiene*, by Dr. Parkes, 1873, 4th Edition, p. 112.

with carbonic acid. The dangerous consequences are first made manifest in the reduction of the force and frequency of the heart's action,* and in the enfeeblement of the whole capillary circulation, which causes the brain gradually to become exhausted from the diminished quantity of blood it receives ; and then follow headache, languor, and incapacity for sustained mental exertion.

When the amount of carbonic acid in the atmosphere is large, the requisite elimination of it from the lungs does not take place, and the blood, becoming more venous and impure, fails to impart its accustomed stimulus to the cerebral vessels, which now fall into an atonic state ; while the normal amount of oxygen in the blood is replaced by the retention of the gas, and a diminution of vascular pressure.

In one form of headache the symptoms appear to have arisen from gas-poisoning, *i.e.* gas generated by putrefaction, fæcal fermentation absorbed into the blood, and thus producing its effects upon the brain and spinal cord.

This form of headache often commences with a feeling of heaviness and dulness the first thing in the morning, and gradually increases till the middle of the day, when it may be temporarily relieved by luncheon ; but it soon reappears and increases

* Cyon brought a frog's heart to a standstill by passing through it serum charged with carbonic acid ; on removing the carbonic acid from the serum, the heart began to beat again.

through the afternoon and evening, unless relieved by treatment.

In the head there is a sense of heat, weight, and dulness, with nervous prostration and inability to apply the mind to work, or to make any physical exertion—the legs seeming to lose their power more or less.

The tongue may be quite clean, or have a little white coating ; but it never has the thick yellow fur at the back and sides, so frequently present in the bilious headache.

Treatment.—In the headache due to atmospheric impurity, the only remedy is a drastic purge in a fluid form, to ensure rapidity of action. This brings away a foetid evacuation, with the escape of extremely offensive gas, generated by the putrefactive fermentation which has taken place instead of healthy digestion. Senna, aloes, Tamar-Indien, syrup of buckthorn, are amongst the most useful remedies. Saline aperients are utterly useless, as they fail to bring away the offensive gas, and only produce watery evacuations—a little saline may be usefully combined with the drastic, as quickening its action and allaying any feverish condition, but the drastic must be relied upon and its effect obtained. Stimulants are decidedly injurious.

This form of headache with gas-poisoning very much resembles the headache from gas-poisoning by sewer-gas from decomposed bodies in the dead-house

and dissecting-room. The old "body-snatchers" were quite familiar with it.

My friend, Mr. W. Adams, informs me that in the year 1842, and for some few years afterwards, when he used to make the *post-mortem* examinations at St. Thomas's Hospital, he had as a dead-house assistant a well-known man who had been one of the leading body-snatchers for many years, and he told him that, when doubling up a body and putting it into a sack, the body-snatchers always turned their heads away, and were extremely careful not to inhale any of the gas which generally escaped from the stomach of the body when bent. If the body-snatcher should "get a gulph," as he expressed it, he knew it would be followed by headache and nervous depression from gas-poisoning, and he had learnt from experience that these symptoms would be increased by gin or brandy, to which he would naturally resort. This man told Mr. Adams that on these occasions he always avoided spirits, and took two strong pills as soon as he got home. Thus he had learned that the eliminative treatment by a drastic purge was the only reliable means of curing the headache and depression produced by gas-poisoning.

In the *treatment* of the forms of headache arising from specific fever, careful judgment will be required. When the brain is oppressed by the high temperature of the blood, and the accumulation of effete and poisonous matters within it, there is imminent danger

to life, if this state of things is permitted to go on unchecked. The local abstraction of blood is a measure to be held in recollection, seeing that it has sometimes averted the most threatening cerebral symptoms. It removes the extreme venous tension, and, by promoting a free action of the skin, brings down the temperature. Three or four leeches applied to the temples will act in a most efficacious manner, and relieve the patient more completely and quickly than any other remedy at our command. Cold affusion to the scalp, or the application of the ice-cap, may, in ordinary cases, render their employment unnecessary, but the abstraction of blood is sometimes the only chance of subduing the pain, and amending the patient's general condition. In the headache of aged and feeble persons, who are struck down by fever, warm fomentations appear to be of service. They were used by the late Dr. Graves, and by Dr. Murchison.* It must be understood, however, that there is the headache of exhaustion which succeeds sleeplessness, and is independent of any inflammatory condition of the brain or membranes. For this state, quinine, ammonia, and opium may be demanded to restore the equilibrium of the brain, and to mitigate the nervous agitation which is associated with it.

In the headache due to *renal change*, the indications are to remove any excessive amount of urea from the system. The patient should be put on a milk diet,

* *Loc. cit.*, p. 274.

and animal food and stimulants avoided in every shape and form, or the congestion of the kidneys will increase, and blood appear in the urine. The action of the kidneys will be promoted by giving acetate or citrate of potash and digitalis (Form. 1-2), or the same salt with spirit of juniper and decoction of broom. Cream of tartar drink (tartrate of potash, Form. 3), will mildly excite the action of the renal organs, as well as freely open the bowels. Diaphoretics, hot-air baths, etc., are useful at the proper time, by assisting the elimination of urea through the skin. If the headache is severe, and there are convulsions, with a scanty discharge of concentrated urine, a mustard poultice to the back of the neck, or cupping over the patient's loins, may be demanded, to calm the cerebral irritation. If anasarca should come on, and there are indications of cerebral œdema, or effusion into the ventricles, then the digitalis and citrate of potash mixture will be required to rouse the flagging action of the heart and kidneys. Where anæmia is complicated with anasarca at this stage, and the blood gets gradually thinner, and more impoverished, I have found minute doses of the perchloride of mercury, with the tincture of the perchloride of iron, of great service (Form. 4).*

* *Diseases of Children*, by the author, 1885, 2nd Edition, p. 227.

proves the vitiated state of the blood at the same time. Under this treatment I have witnessed every trace of anasarca disappear, and the headache depart entirely.

Dr. de Havilland Hall tells me that he once had two patients, male adults, under his care suffering from advanced Bright's disease, in whom headache was a persistent and most troublesome symptom. In one case, six half-drachm doses of the chloride of ammonium gave relief from the pain which had lasted for eight months; and in the other case, though the benefit was not so striking, still the patient expressed himself as much relieved.

In the headache due to malarial poisoning, a full dose of quinine will be advisable, if it be periodical in character. As large a dose as gr. x. or gr. xv. has been recommended before the attack, and it may be necessary to push it to cinchonism in divided doses, and then gradually diminish the dose (Form. 5).

The following was a severe case of hemicrania from malarial poisoning.

Mr. R., æt. 49, m., sallow, tall, and corpulent, consulted me in July, 1877. He had lived in Bombay for twenty-five years, and had experienced good health till the year 1868, when he began to suffer from headache, diffused over the whole forehead. Two days later he had a bilious attack—violent spasms, retching, bringing up large quantities of bile, which was also passed by the bowels. The attacks

came on once or twice a week, and the doctors ascribed them to malaria. There were new drainage works going on, which his duties called upon him to superintend. After suffering more or less for fourteen months, he went to Australia, and there lost his headache; but on his return to Bombay he suffered again, within six or eight weeks.

In 1870 he was ill again, and, in consequence, came to England, and lost his bilious attacks, but not his *headache*. His wife, who was with him in India at the time, became subject to similar attacks, and it was only in 1876 that they abated in severity.

In November, 1872, he returned to Bombay, and was as bad as ever; then he suffered from 1872 to July, 1877, and for some time took forty-five grains of quinine in three doses daily for *one month*; the effect was to keep off the headache for *one year*, during which time he felt well; the urine was clear, and the motions were healthy. When the headache was bad, heat or cold applied over the eye would give relief: occasionally there was pain in the right eye, and insupportable depression of spirits accompanied it.

In 1875 he came to England again for three months, and derived considerable benefit; returned in November, and after being a month in Bombay the spasms, vomiting, and headache returned in all their former severity. He took ipecacuanha, which

made him sick and ill ; and since then he has had no vomiting, but severe headache, extending through the left eye and temple, which would find its escape through the left shoulder. He was worst at noon, when the sun was at its height : generally the pain would begin at 3 a.m. and last till 7 p.m., when he fell asleep, and woke up relieved in a few hours : a cup of tea or coffee would sometimes relieve the pain quickly. Heavy sleep and snoring were invariable precursors of an attack. During the year 1874 his memory, which was formerly acute, had become very defective.

There is no disease of the heart, liver, or spleen ; abdomen very large and flabby ; he is now fidgety and irritable, and cannot bear the least noise or excitement : he looks pallid and sallow ; pulse 96 ; tongue clean ; bowels free ; urine clear, reaction acid, sp. gr. 1020, non-albuminous. He has taken tincture of gelseminum, croton chloral, and bromides, without benefit. He was now ordered arsenic, quinine, and bromide of potassium twice a day in a mixture, and a dose of Friedrichshalle water in the morning, twice a week. The diet was to be plain and simple, with a little claret and water with his meals ; cheese, pastry, and tea to be avoided.

July 9. Has had some headache over the left eye, but not so piercing or severe ; he caught cold a few days ago, which he considers a sufficient cause. The bowels not having acted satisfactorily, he was

ordered to take two pills of aloes and myrrh, with half a grain of sulphate of iron (Form. 86).

July 12. He is much better, and has had no headache since the last visit. Two pills acted well, and produced two motions ; urine clear : he feels stronger and not worried with anything or anybody ; pulse 84 ; free from pain entirely. His aspect is now clear and animated.

July 17. On the 15th, 16th, and 17th headache began at 3 and 4 a.m., and lasted till 8 and 9 a.m., each morning. It commenced over the entire brow, forehead, and eyes : now it has extended to the left side of the head, and he has pain and tightness in the right side over the liver. The pain makes him emotional ; he can scarcely avoid crying or being excited, and he often sheds tears when reading. The region of the liver is tender and its area slightly increased ; the urine is turbid and high-coloured. He was ordered a pill containing a grain of calomel at bed-time, a sulphate of magnesia draught in the morning, and citrate of potash with quinine in an effervescing mixture during the day.

July 25. On the 22nd he went to church, and there felt pain ; on the following day it recurred ; then on the succeeding evening had attacks lasting for some hours. This occurred for three evenings, and on the 23rd did not get up till 6 p.m. The pain begins in the left eye, and then extends over the head, but he has had no shivering ; he sleeps better, and is

certainly improved in all respects. A mixture of citrate of iron and arsenic was now ordered to be taken twice a day, after food, when free from headache, and the bromide mixture when an attack was threatening (Form. 26).

July 30. His head had been better, but two mornings since he had acute pain over the liver, sudden and piercing, and this he has experienced in Bombay. There are no physical signs of hepatic congestion; the urine is clear, and the bowels free. The iron mixture seems to exert a slightly aperient effect.

August 14. He had no attack whatever till the 10th, when it began in a moment at 4 p.m., and continued all day and night. On the 11th the pain was better in the early morning, then it returned at 1 p.m., and lasted all night. Before the attack of headache comes on, the urine is always cloudy and thick, and when it passes away it becomes clear. This periodicity in the headache suggests the use of quinine in large doses, and therefore the previous medicines were discontinued, and two pills, each containing three grains of quinine, were prescribed twice a day.

September 26. A month's residence at the seaside improved his general condition, but he had three attacks, two mild and one severe. He took quinine only when the pain was on him.

October 6. On returning to town a few days since, he got an attack of headache which seized the

forehead at 3 a.m., and then, settling in the right temple and eye, gradually passed up to the top of the head, where, as a heavy weight, it would last for hours. I now gave a phosphorus capsule (gr. $\frac{1}{30}$ daily) and quinine and iron in a mixture ; in addition, as the patient was corpulent, a Turkish bath was ordered once in ten days, and a dose of Friedrichshalle water twice a week.

December 11. The patient reported himself quite well in health, and his general appearance and manner fully bore out his testimony, for he was now active and energetic, and most desirous to return to his duties in India. He had in a great measure exchanged his sallow aspect for a fresh colour, and his eyes sparkled with intelligence and vigour ; he took long walks without fatigue, and went into society without experiencing any after ill effects. In February, 1878, he returned to Bombay quite well in health.

If the pain continue to recur in these cases, Fowler's solution and tincture of belladonna, in five-drop doses, are recommended by Dr. Smith, increasing the arsenical solution one drop each day (Form. 6 to 9). It may be advisable to persevere with this combination if phosphorus and quinine should fail. Arsenic is a remedy of the greatest possible value in nervous cases, if it is given judiciously and watched carefully, but it is too generally abandoned on the first symptoms of constitutional irritation becoming manifest, and when

its alterative effects on the blood are about to be secured. Under these circumstances it should be suspended for a time, and then cautiously resumed. Every practitioner should make himself familiarly acquainted with the physiological signs of arsenical action, for the exhibition of small doses long together, in some persons of peculiar idiosyncrasy, is accompanied with so much nausea and nervous depression, as to render the continuance of the remedy inadmissible.*

Phosphorus is another good remedy in nervous and neuralgic headache, and also in that form arising from the poison of malaria, as we have just seen, where the nerve-centres are depressed and exhaustion is the consequence of it. Its action is not unlike that of iron and cod-liver oil, and it is a constituent of many of the tissues, especially the nervous. I have now and then observed its beneficial effects after the failure

* "Arsenic, when given continuously in moderate doses—say, five drops of the liquor arsenicalis, diluted largely with water, twice or thrice a day—will, sooner or later, generally within eight or ten days, produce increase of heat and dryness of skin, together with acceleration of pulse, followed by a sense of heat and itching of the eyelids, to which succeed swelling and tenderness; the conjunctiva becomes inflamed, the eyes sensitive to light, and the orbits surrounded by a dark discoloration. The tongue at this time will be found finely coated with a white silvery film, resembling that produced by touching its surface with a weak solution of the lunar caustic. . . . The throat becomes dry and sore, the gums swollen and tender; and, if the medicine is still further persisted in, salivation ensues."—"On the Physiological and Therapeutical Effects of Arsenic," by James Begbie, M.D., F.R.S.E.—*Contributions to Practical Medicine*, 1862, p. 270.

of other well-known remedies, and therefore, in all obstinate cases, it should have a fair trial, as its general tonic effects in repairing the waste of nervous tissue are very marked, and in my experience it has occasionally produced the happiest results.

Phosphorus is one of the most important agents we possess in nervous exhaustion, and its efficacy is undoubted when administered in an unoxidized state, capable of being readily assimilated. No remedy requires more care in prescribing than this, for whilst in small doses it is a gentle stimulant and tonic, in large doses it depresses the heart's action like chloral, and is not free from danger. It may be well to begin with the gr. $\frac{1}{60}$, but I have seen no ill effects from gr. $\frac{1}{30}$; and this, after a time, may be taken twice a day. I never exceed this quantity. Then as to the best mode of giving it. The Pil. Phosphori of the British Pharmacopœia is seldom ordered, as it is open to objections, which are now overcome by more recent modes of prescribing phosphorus in such a form as shall ensure its activity. The pharmacopœia pill, when made, is kept in water, and after a time it becomes extremely hard, and resists absorption in the stomach, passing through the intestines in an unchanged state.

As an excellent solvent of phosphorus, cocoa butter and Castile soap have been recommended ('Year-book of Pharmacy,' 1876) to form into pills which will keep well, and retain their properties. Messrs.

Squire recommend a formula composed of mutton suet, liquorice, and mastic. They consider it an excellent combination, as the virtue of the phosphorus is retained, while in this form it is taken up readily by the stomach.

The perles of phosphorus are an excellent form for administration. They appear to retain the virtues of the drug for an indefinite time, and to be readily digested and absorbed (Form. 89).

This leads me to say that the sugar-coated pills containing phosphorus are unreliable. I am told, on good authority, that the phosphorus is oxidized or volatilized by the necessary heat employed in the process. If there is a base such as oxide or carbonate of iron, or strychnia, it will form a chemical combination and become a hypophosphite. Hypophosphites are made by boiling phosphorus with lime or soda.

Caffeine tabloids, as previously alluded to, have been employed with success hypodermically in malarial neuralgia.*

It is a common impression that fish is very valuable as an article of diet for brain-workers, because it is rich in phosphorus ; but this is not so. The researches of M. Attwater have shown conclusively that fish meat contains no more phosphorus than butcher's meat. The deficiency of fat renders fish much more digestible, and this is the reason that men who lead

* See p. 186.

sedentary and studious lives are able to digest it better than meat, which causes flatulence and other symptoms of dyspepsia. These persons frequently pass alkaline urine with excess of phosphates owing to disordered digestion. It is important in these cases not to overload the system with food, as the power of elimination is lessened if the patient is delicate, or has passed fifty years of age. The meals must be light and nutritious, and taken in such moderation that too much duty is not imposed upon organs whose energy and activity have diminished. For further information on this subject, I would refer the reader to some very useful hints by Sir Henry Thompson.*

Cod-liver oil, as in all forms of neuralgia, is sometimes of great service in hemicrania and neuralgic headache, if the opportunity is seized of giving it in the intervals of suffering, when the patient is free from pain. As in some cases of gastralgia, cod-liver oil brings relief when ferruginous tonics and the most careful diet fail, so will it frequently ward off attacks of neuralgic headache by improving general nutrition, and strengthening the tone of the nervous system.

* *Diet in Relation to Age and Activity*, 1877.

CHAPTER X.

ARTHRITIC OR GOUTY HEADACHE.

Irregular and Retrocedent Gout—Sometimes, though not frequently, the Accompaniment of Acute Articular Gout—Illustrative cases—Influence of Gouty Diathesis—Relation of Gout with Excretion of Uric Acid—Uric Acid Headache, so called—Dr. Haig's Experiments—Affection of Brain and Membranes in Suppressed or Irregular Gout—Character of the Pulse and Heart Sounds—Treatment—Importance of exciting Action in the Eliminative Organs—Mercurials—Podophyllin—Alkalies—Homburg Salts—Salts of Lithia—Carbonate of Ammonia.

IN order to understand the nature of gouty headache, we must have a knowledge of the nature of gout itself. Many persons are apt to look upon gout as a disease almost exclusively affecting the joints, but it is a blood disease of a specially pathognomonic character, producing changes in the various organs and tissues of the body. It is, therefore, to the depraved state of the blood that we must look for an explanation of the gouty phenomena. A gouty diathesis exposes the brain to inflammatory and functional disturbance. Gout may seize the head, as it may the stomach, the foot or the hand, or a joint,

for which it has a special affinity. Instead of a regular attack of gout affecting the joints, the impure blood may affect the head, and set up a very different train of symptoms from those we usually meet with. It may invite an acute congestive headache, or a chronic headache. Hemicrania is not uncommon, and neuralgia affecting the fifth pair of nerves. In some instances the gouty inflammation deserts the joint, and this is not unlikely when the patient is exposed to cold and fatigue. It may even produce apoplexy, or maniacal symptoms,* or it may involve the fibrous membranes of the brain.

When the febrile disturbance is considerable, and the secretions are vitiated, acute gout is now and then attended with severe frontal headache, and weight across the eyes. Many persons who experience periodical attacks of acute articular gout escape headache altogether; but others are not so fortunate. I should say from my own experience that headache is not a frequent accompaniment of gout, and that, whenever it is present, it is most frequently in those persons whose general health has been shaken by many previous attacks, and whose nervous system has suffered in consequence. One gentleman, who consulted me in 1867, stated that for upwards of twenty years he had been a martyr to gout, but that the last attacks had alarmed him from the severe headache which accompanied them, although the foot was swelled

* Garrod, *On Gout and Rheumatic Gout*, 1876, p. 441.

and inflamed, and the urine copious and free from albumen. The pain was frontal, obstinate, and depressing, and, as may have been expected, it continued for some days after the local inflammation had subsided. Carbonate of ammonia proved a reliable remedy; and sometimes a stimulating draught, consisting of quinine, spirit of chloroform, and camphor, was of great use in affording relief (Form. 16-30).

A gentleman, thirty-five years of age, who was suffering from his fifteenth attack of acute gout in May, 1876, consulted me for headache, which was a new symptom of his complaint. The right great toe was vividly inflamed and tender, and had been so for some days before I saw him. His nights were disturbed and restless (as they had been on many former occasions), but he was reluctant to attribute the headache to pain in the joint, or to want of sleep. As the urine was abundant and clear, and the bowels thoroughly open, I attributed the headache to the articular pain and general weakness. I prescribed the carbonates of ammonia and potash in effervescence, with small doses of colchicum, and under this treatment the local disorder soon subsided, and the headache departed.

Sir A. Garrod mentions a very interesting case of a lady, sixty years of age, who consulted him for intense headache, from which she had suffered about seventeen days. The pain chiefly occupied the vertex and back of the head, and was somewhat periodic in character. There was heat and tenderness of the

painful part. The affection was considered hysterical at first, but on the next evening the pain suddenly left the head, and the ball of the great toe became acutely painful and tender, swollen, red, and shining. It was a severe attack of acute gout. The occurrence of a second fit after some months was not preceded by headache.*

The influence of the gouty diathesis in exciting severe headache is well illustrated in the following case recorded by Dr. Begbie.† For the limitation of space at my disposal, I shall make no apology for abridging the details. A lady, aged thirty-five, of

* *Op. cit.*, 1876, p. 459.

† 'On Gout and the Gouty Diathesis.'—*Contributions to Practical Medicine*, 1862, p. 29, case xvi.

"It is somewhat difficult to class the several forms of intermittent headache with other affections of this kind; but those having lengthened periods of intermission may best perhaps be noted here. The equality of time often observed, even where the intervals extend to two or three weeks, or yet longer, is a very remarkable feature in these cases, and denotes a cause specific in its nature and uniform in its operation. I know instances where such intermittent headaches have occurred during the greater part of a protracted life. More frequently, however, it happens that they affect especially certain periods of life;—in this, as in many other circumstances, showing singular relation to the disordered actions of the gouty constitution, with which, as I have stated in a former chapter, I cannot doubt their close kindred and dependence on the same causes. In conformity with this view there is reason to believe that the kidneys are the excretory organs most concerned in giving relief in these cases, and principally by an increased separation of the lithic acid or its compounds. Such action may readily escape notice, where the attention is directed by the presence of pain to another part; but I infer it from close observation of many intermittent headaches, and think the remark likely to be confirmed by others."—'On Morbid Actions of an Intermittent Kind.'—*Medical Notes and Reflections*, by Sir H. Holland, Bart., M.D., F.R.S., 1855, p. 288.

full habit and florid complexion, had suffered for many years from severe and lasting headache, which had defied the power of many and divers remedies. It was difficult to fix upon any variety of headache which had been observed to answer to the character of that which she presented. "It was not nervous or hysteric ; it was not inflammatory or congestive ; it was not anæmic ; it was not dyspeptic. It could not be traced to cerebral disease ; it was not of neuralgic or rheumatic character ; it was not periostitic ; it was not periodic. As the urinary secretion from time to time presented alternately oxalates and lithates in great excess, and the hands of the patient's father presented 'the little knobs of Herberden,' some light at length arose to reveal the true character of the perplexing headache. The paternal grandfather was the victim of gout, and died of heart disease. Under the persistent employment of a combination of colchicum with the nitrate and carbonate of potash, aided by those regulations of diet and exercise which are suitable to the gouty habit, the severe headaches were relieved and ultimately removed."

There is another form of headache occurring to persons subject to irregular gout, and who are sallow and cachectic in appearance. This form is far more important than the varieties we have been considering, because it denotes a more serious affection of the brain or membranes by the gouty poison, due to the latter not finding its proper vent through the

joints and cutaneous surface. Some years ago I attended a gentleman who suffered from this form of headache. He was nearly sixty years of age when he first came under treatment, and remained under my observation for upwards of twelve years. The character of the urine and alvine evacuations indicated great disorder in the functions of digestion and assimilation; and, although there were pains and obscure swellings in the knuckles, wrist, and feet, no regular attack of gout ever showed itself. The symptoms were due to the retention of the gouty poison. The patient was liable to be seized with giddiness in walking, and could only be saved from falling by being supported. He experienced at the same time noises in the ears, and a sensation as of something giving way in the head. His complexion was sallow, his sight dim, his face bedewed with perspiration, and his pulse weak and slow. His tongue was generally clean, or only very slightly furred; while the motions were always either clay-coloured or dark and bilious, and the urine threw down a thick reddish sediment. It was noticeable that the headache was often relieved when the urinary secretion became thus changed. An active mercurial would generally, I found, relieve the headache after the secretions were rectified; but occasionally the symptoms would continue for days, accompanied with extreme flatulence, disordered digestion, and irritability of temper. On some

occasions there were fearful attacks of painful colic ; but when these were present the head was free from discomfort.

A gentleman, fifty-four years of age, of temperate habits, who had long been a martyr to articular gout, was taken ill in June, 1884, with severe frontal headache. It was an acute congestive headache, due to the retention of the gouty poison. He took a Turkish bath, which he was accustomed to do, and in the evening felt ill and had no appetite for dinner. About three a.m. on the following morning he woke up with a terrible frontal headache, which continued for sixteen days—during which time he could not lie down, but was propped up with pillows. The application of four leeches to the temporal region relieved the tension and throbbing, and afterwards iced water rags continuously applied to the forehead greatly mitigated the suffering. The temperature varied from 100° to 103° , whilst the pulse was slow and weak. At one time there was double vision, ulceration of the throat, accelerated breathing, and great exhaustion. Tea, milk, and farinaceous food were the forms of nourishment. An occasional mercurial purgative, chlorate of potash, bromide of potassium, and hydrate of chloral were the drugs employed. The patient made a good recovery, and although there have been occasional attacks of articular gout since, there has been no return of severe headache.

When effete products accumulate in the blood,

the vaso-motor centre becomes damaged, and the minute arterioles are thrown into a state of spasmodic contraction. This is proved by the increased tension in the pulse, and the reduplicate and accentuated sounds of the heart, as in the case of albuminuria. In the confirmed gouty headache of advancing years the cerebral arteries are atheromatous and thickened, and their calibre being diminished, the blood supply to the brain is insufficient to nourish it. The emotional conditions to which this important change gives rise are shown in outbursts of passion, and fits of melancholy depression. "Irascibility is the characteristic *par excellence* of a brain fed with blood laden with gout poison, and hastiness is habitual; but as the condition of heart-failure becomes slowly developed and superimposed upon the gouty condition, the characteristics of cerebral anæmia are blended with those of lithiasis." *

In connection with gout and the headache to which some gouty people are liable, I may here refer to Dr. Haig's recent investigations on what he terms "*uric acid headache*." † He attempts to prove that a certain form of headache, which, he says, has been called migraine, sick headache, nervous headache, bilious headache, etc., has a direct relation to the excretion of uric acid in the urine; but the subsequent discus-

* 'On Cerebral Anæmia,' by Dr. J. Milner Fothergill.—*West Riding Lunatic Asylum Medical Reports*, vol. iv. p. 104.

† *Med. Chir. Trans.*, vol. lxx. p. 355.

sion on the subject goes a long way to show that his conclusions are not universally adopted, and I am of opinion that the history and symptoms to which he alludes point to the nervous system as being the root of the trouble, and that the uric acid was not an essential factor in the case.

As Sir Alfred Garrod has pointed out, patients suffering from acute gout do not excrete an excess of uric acid, but rather the reverse. It is thrown out in large quantities as the disease is passing off, and all his analyses show that in acute gout the uric acid eliminated is subject to much variation. In the cases Sir Alfred Garrod has recorded, there was an abnormal quantity of uric acid in the blood, proving that the renal organs were unable to excrete the uric acid, so that a large quantity of it in the urine, instead of indicating a contaminated state of the blood, favours the opposite view, for if the kidneys excrete freely, the blood has a much greater chance of remaining pure.* Clinically speaking, uric acid is of all others one of those deposits we generally expect to recognize with the naked eye, being of an orange-red appearance, or like cayenne pepper. Such a deposit, in my experience, is as rare, in cases of headache, as the secretion, pale, clear, copious, and of low specific gravity, is common. It is only in exceptional instances, when the crystals are very minute, that the microscope is needed to discover them. The urine

* *Op. cit.*, p. 132.

depositing uric acid is generally of a deep yellow, or orange colour, and is invariably acid, though, Sir William Roberts has shown, the amount of uric acid has no relation to the degree of acidity of urine.* It varies so much in different persons that from day to day one will pass double or treble the quantity of another, though living on a similar diet, and under the same circumstances of life.†

Dr. Haig's paper, on "*Variations in the Excretion of Uric Acid produced by Administration of Acids and Alkalies*," ‡ contains the result of some interesting experiments. He found that within certain limits the excretion of uric acid could be increased or diminished at pleasure, acids effecting a decrease, and alkalies an increase of the excretion. The relation of uric acid to urea appears to vary in different people from $\frac{1}{30}$ (*i.e.* 1 grain of uric acid to 30 of urea) or $\frac{1}{40}$. If $\frac{1}{35}$ be chosen as a definite number, and the patient take the following day 60 grains of citric acid, repeating the dose three or four times a day, the uric acid to the urea will be found relatively diminished, say $\frac{1}{41}$. If after an interval 40 grains of citrate of potash be taken three times a day, instead of an acid, then there is a reverse, say a relation of $\frac{1}{28}$. In this there is much that is suggestive, and further experiments may lead to something certain and definite.

* *Urinary and Renal Disease*, 1876, p. 66.

† *Ibid.*, p. 64.

‡ *The Journal of Physiology*, August, 1887, vol. viii., Nos. 3, 4, p. 211.

Treatment.—Bearing in mind the influence which the gouty diathesis exerts in the production of secondary disorders, we must endeavour to purify the blood as much as possible, by careful diet and regular exercise. In all cases it is most important to guard against constipation. A free evacuation from the bowels is not only one of the best means of preventing a recurrence of articular gout, but it helps to purify the blood, and to maintain the digestive organs in a better state. The liver should be kept in good working order, so that extra duty be not imposed upon the kidneys. For this purpose I have found that a large teaspoonful of Homburg salts, taken for several successive mornings before breakfast, in half a tumblerful of lukewarm water, has afforded great relief to the system, and warded off headache for weeks and even months. When the evacuations are dark or clay coloured, mercurials, podophyllin, euonymin, and alkalies may be needed (Form. 79–80–81–31–94–95 *a*). When the urine becomes turbid and unusually acid, the citrate of potash to the extent of forty grains given daily and freely diluted will be of service, or the citrate of lithia combined with bicarbonate of potash (Form. 33). When, in cases of chronic gout, the kidneys fail in excretory power the brain is very prone to suffer, and the patient may experience mild or severe headache. Local depletion, as in the case I have before mentioned, is very useful when the head-

ache is severe and congestive.* In order to keep this headache at bay, a similar method must be employed as that for the prophylactic treatment of gout,—care in diet, exercise short of fatigue, and the mind kept as far as possible from the cares of business. If the kidneys are structurally unsound the patient is in constant danger of his life from the accumulation of the gouty poison; but if they act well relief may be obtained. This form of headache is due to gout pent up in the system, and damaging the nervous centres, instead of seeking elimination through the joints in the form of articular inflammation. The treatment, therefore, is much the same as for gout, modified according to the peculiarities and exigencies of each particular case. The gouty diathesis may affect in turn all the internal organs, and hence we meet with intestinal disorder, palpitation, syncope, dyspnœa, vomiting, and headache. These symptoms are liable to occur periodically with those persons whose constitution is not vigorous enough to throw off the poison through the joints. It is in fact, an internal fit of the gout, and the treatment must be conducted on general principles; always bearing in mind the liability of the brain to be depressed by the incautious use of sedatives, and particularly of colchicum. For, as Sir A. Garrod says as the results of his analyses, there is no evidence that colchicum causes the kidneys to eliminate an

* See p. 285.

increase of uric acid; in fact, when the drug is long continued, it has a contrary effect, and if it excites the action of the bowels, it diminishes the quantity of urine. He adds that Boeker's observations made in 1849 indicate that colchicum decreases the elimination of urea, and uric acid by the renal organs.*

In retrocedent and irregular gout it is important to bring it back into the extremities, if possible, by immersing the foot or hand in hot water, or applying a mustard poultice. A pill of colchicum and quinine has been recommended in some forms of irregular gout. Carbonate of ammonia will relieve the head, and minute doses of colchicum may be tried with it to act as an alterative on the blood (Form. 16-32). Abstinence from beer and wine by tending to prevent the occurrence of gout should be observed, though sometimes a little whisky, or brandy, promotes digestion and appears to be useful. Some patients can take a little sound claret or dry hock with advantage.

* *Op. cit.*, p. 334.

CHAPTER XI.

RHEUMATIC HEADACHE.

Causes—Symptoms—Diagnosis—Treatment—Importance of Diet and Attention to the Digestive Functions—Iodide of Potassium—Bark—Colchicum—Salicylate of Soda—Baths and Waters.

THIS is occasionally met with in rheumatic subjects, and may be associated with rheumatism in other parts of the body. It comes on from exposure to cold in railway travelling, from the head being uncovered (especially when heated or perspiring), or from sudden changes of temperature, when north or east winds prevail. It is sometimes traceable to sleeping in a damp bed. But even then it is probable that there has been some predisposing derangement of the general health, or some stomach or liver disorder. It affects the aponeurosis of the scalp, and the occipito-frontalis muscle; indeed the tendinous attachment of the muscle over the brow, temples, and occiput are the chosen seats of pain. The pain is marked by an aching and a tenderness of the scalp and jaws, severe, heavy, and continuous; there is an aching too of the

teeth and gums (which are often exquisitely tender), and mastication becomes painful. There is no throbbing of the temporal arteries, nor elevation in the temperature of the scalp, but the face is sometimes flushed, the eyes are injected, and the vessels of the head and face are loaded and excited, so that if the patient is of full habit, he gets a somewhat bloated appearance. The pain increases in the evening, and grows less towards morning. Sir E. Sieveking points out that, according to Romberg, the pain is of a paroxysmal and hemicranial character, especially affecting the forehead and vertex, from which it radiates in various directions. "I do not," he continues, "find that authors allude to the possibility of an intracranial rheumatic affection; but I have repeatedly met with cases of cephalalgia in which no such external indications presented themselves, and in which the concomitant symptoms, though but feebly marked, the history of the case, and the anti-rheumatic treatment adopted, appear to justify the conclusion that the dura mater, the fibrous envelope of the brain, was the seat of the disease."* This remark quite coincides with my view of the affection, for the dura mater might with as much show of reasoning be expected to sympathize in rheumatic headache, as that the fibro-serous pericardium should sometimes be involved in acute articular rheumatism.

* 'On Chronic and Periodical Headache.'—*Medical Times and Gazette*, 1854, p. 209.

Neuralgia is sometimes associated with rheumatic headache.

The urine, as in the gouty, often contains uric acid crystals, and their presence in abnormal quantities is an indication of defective digestion and congestion of the liver. For all practical purposes an analysis is easily made. If the urine has a strong acid reaction, and the deposit thrown down on cooling disappears on the application of heat, and the secretion becomes clear, we are sure that it consists chiefly of urate of soda and ammonia. If the deposit is persistent it shows that assimilation and digestion are defective, whilst nutrition is impaired; the blood is loaded with waste materials, not perfectly transformed, and eliminated by the kidneys in the shape of urates, which sometimes irritate the bladder and urinary passages, causing frequency of micturition and other troublesome symptoms.

When uric acid crystals are met with frequently in the urine, they are far more significant than urates alone, and indicate that the digestive functions are more depraved, as we witness in persons of gouty and rheumatic constitution. If the patient indulges in much animal food, leads a sedentary life, and is liable to temporary congestion of the liver from over-taxation of the digestive organs, considerable deposits of uric acid may be met with in the urine. I have entered into this subject rather fully here because I have met with patients of rheumatic constitution

liable to this form of headache, whose urine presented from time to time the appearances I have just described.

Sir W. Roberts remarks that when a deposit of uric acid occurs, twelve or twenty hours after emission it has no pathological significance; but if it takes place within three or four hours after being voided, it is not natural, and if before the urine cools, it is calculated to awaken apprehensions that a similar event is taking place in the urinary passages which may give rise to gravel and calculi.*

Diagnosis.—When the circulation is deranged from those morbid causes which give rise to gout and rheumatism, we may naturally expect to meet with certain forms of headache. To arrive at a correct view concerning their nature, we must look to hereditary influences, to individual habits, to the state of the liver, and especially to the character of the urinary secretion. There is seldom any difficulty in drawing a distinction between the headache of gout and that of rheumatism, if we carefully investigate the history of the case, and ascertain whether the patient has ever had an attack of true gout, or rheumatism, and which joints were affected. I do not believe in the co-existence of gouty and rheumatic headaches, since gout and rheumatism are not associated. The habits that favour the one do not promote the other. Rheumatic gout has a special pathology of its own; it has

* *Op. cit.*, p. 66.

no relation to gout, and not necessarily to rheumatism, as pointed out many years ago by Sir A. Garrod.* It is more frequent in women. A gouty headache is chiefly frontal, and accompanied with depression of spirits in severe cases, with giddiness and disturbed vision.† In rheumatic headache the patient is not so completely powerless, the pain is more superficial and paroxysmal, and there is frequently the history of some rheumatic affection of the muscular system.

Treatment.—For the treatment of this headache attention to diet is of primary importance, in order to counteract the rheumatic tendency. Vegetables, milk, and tapioca are preferable to animal food, and a little dry wine to beer and spirits. Any derangement in the digestive organs must be overcome by suitable remedies, in order to restore the functions of the bowels, skin, and kidneys (Form. 3-19); and where the local disorder has followed a general attack or is complicated with neuralgia, then iodide of potassium, bark, the alkaline carbonates, and small doses of colchicum will be serviceable (Form. 36-34-35). Iodide of potassium in five-grain doses, with a drachm of aromatic spirit of ammonia, or five grains of carbonate of ammonia in an ounce of water, three times a day, will be found serviceable. Dr. Lauder-Brunton recommends a formula which he has very successfully used at the suggestion of Dr. Image, of Bury St. Edmunds (Form. 34 a). Salicylate of soda will often

* *Gout and Rheumatic Gout*, 1859, p. 530.

† See p. 285.

relieve gouty and rheumatic headache. It should be given in ten grain doses in plain water or camphor-water, with a little aromatic spirit of ammonia.

When the urine is changed in the manner alluded to, the nitrogenous elements of the food must be withheld for a time, and the bicarbonate, citrate, and acetate of potash be freely administered, because they produce an alkaline state of the urine, and dissolve the uric acid crystals when present.*

When the patient is anæmic, quinine or iron, with iodide and bromide of potassium, will sometimes give relief in the last two forms of headache (Form. 31 *a*-36 *a*).

A sudorific at bed-time, and a liniment to the temples or the nape of the neck (Form. 73), will often relieve the wearing pain. Warm clothing is very essential, and I know of one gentleman who obtains most relief from wrapping up his head in flannel. If the case is obstinate, and the patient has the means to procure change, he may with advantage go to Vichy, Ems, or Homburg, and take the baths and waters there.

* See p. 287.

CHAPTER XII.

SYPHILITIC HEADACHE.

Action of the Syphilitic Poison on the Cerebral Tissues and Nerves—Symptoms—Affection of the Periosteum—Caries of the Bone—Gummatous Growths—Diagnosis—Ophthalmoscopic Signs—Neuro-Retinitis—Choroiditis—Symptoms of Syphilitic Headache—Consequences—Treatment—Utility of Mercury Perchloride—Iodide of Potassium in Large Doses—Bark—Small Doses of Calomel—Quinine—Morphine—Arsenic—Bromide of Potassium—Counter-Irritation.

THE action of the syphilitic poison upon the nervous system is capable of producing severe headache, disturbance or loss of one or more of the senses, compression of nerves, epilepsy and so forth. It alters the general condition by poisoning the blood and leading to those pathological changes which produce inflammation and its consequences, modified by the severity of the virus and the constitution of the patient. In the tertiary rather than in the secondary stage of syphilis, the virus is capable of exciting hyperæmia, inflammation, and inflammatory growths, impairment of the intellect, exhaustion of the nervous system, periosteal pains and failure of digestion. Serious

morbid changes may be going on in the internal organs, as the kidneys, liver, spleen and other viscera, when the syphilitic poison has lain dormant for some time and has only produced characteristic eruptions of the skin. Hence the disease is masked and the nature of the headache overlooked in its early stages.

Symptoms.—When the membranes of the brain are affected by syphilis, headache is a constant symptom, and the character of the pain is diagnostic. It is sometimes limited to spots on the scalp, which are tender on pressure and occasionally present some swelling, as is seen on the skin and sternum when these parts are affected with nodes. The outer surface of the dura mater and the bone are often involved in syphilitic inflammation, leading to adhesion of the brain to the affected spot, and even suppurative phlebitis. A pink or red swelling from congestion takes place, with a caseous patch in the centre.* “Meyer relates eight cases of intra-cranial disease, in which there were found either fibrinous (gummatous) tumours in the brain, or the results of internal periostitis, or inflammation of the membranes, besides more or less marked indications of syphilis in the liver, inguinal glands, or other parts.”† When a gummatous, tumour exists in the cerebral substance pain may be absent ; but when the tumour is growing from the skull, and irritating the dura mater, or

* *Pathological Anatomy*, by Wilks and Moxon, 1875, p. 198.

† *New Sydenham Society*, article, “Nervous System,” 1862, p. 79.

springing from the membranes, or involving some important nerve, pain is present. When the syphilitic affection is limited to the dura mater the pain is intense, localised, and increased on pressure ; whereas, when the pia mater is attacked, the pain is neither intense nor localised, but is diffused over the forehead, and is of a dull, aching, and congestive character.* This is quite in accordance with my experience that when syphilis selects the dura mater, whether there be any actual growth, or inflammatory exudation, the pain is intense and maddening, whilst the same degree of inflammation, or even a tumour, in the cerebral substance itself may be unattended by pain.

Pathology teaches us that syphilis has a marked tendency to affect the parts at the base of the brain. Hence any affection of one or more of the cranial nerves, whether evidenced by neuralgia, anæsthesia, or motor paralysis, is very likely due to the syphilitic taint. Oculo-motor paralysis in an adult is a strongly suspicious symptom.

“The invasion of parenchymatous structures by morbid growths is never attended by the *severe pain* which is associated with them in more compact textures. The former condition of pain is much more diffuse than that where the bone is primarily involved, although it cannot be said to produce a more general hyperæsthesia of the scalp. The latter form of pain will sometimes extend to all the muscles of the neck

* Dowse, *On Syphilis of the Brain*, 1879, p. 30.

and upper extremity, inducing very severe hyperalgia. *It is not relieved by pressure.* On the contrary, pressure, if possible, *increases* its severity." *

The pain in syphilitic headache is often paroxysmal. It may come on at a certain hour of the night, and so continue until a certain hour in the morning. It may moderate during the day, but is characterised by nocturnal exacerbations, and hence the subjects of it are prevented from sleeping. It may be circumscribed, and confined to a particular spot, as just mentioned, where the pain is most intense and from which it radiates. Syphilitic headache is usually diffused and deep seated, and the head feels as if tightly compressed, and that the skull is not large enough to hold its contents. The patient, says Ross, "often compares the pain to that which he imagines would be caused by successive blows struck on the head with a heavy mallet." † The pain may also be dull, continuous, or throbbing. If an epileptic seizure happens, it is an indication that the syphilitic lesion is advancing towards the cortex and the cerebral membranes.

On examination of the head there may be detected some swelling, previously alluded to, which may end in caries of the outer table of the skull, and a gummatous swelling from the inner table, causing pressure on the convolutions, and leading to various paralytic

* Dowse, *op. cit.*, p. 25.

† *Diseases of the Nervous System*, 1881, vol. i. p. 546.

symptoms.* Under judicious treatment, when the inflammatory exudation is absorbed, recovery may ensue.

Diagnosis.—Dr. Symonds alludes, in his remarks on the headache of secondary syphilis, to the experience of Sir Spencer Wells, who has noticed a very striking symptom—pain across the forehead where the brim of the hat presses. The pain is due to subacute frontal periostitis, and, if the case be bad, and the system saturated with the syphilitic poison, the specific inflammation may extend to the membranes, and involve the brain itself.

The *ophthalmoscope* of late years has come so much into use, and is such a great aid to the detection of intra-cranial disease, that it ought to be employed, as it may explain the nature of many cases of obscure headache. The changes in the fundi oculorum revealed by the ophthalmoscope, are of great assistance in diagnosis, and afford us valuable information which we cannot obtain from any other source. Evidences of old iritis are among the most frequent signs of syphilis, and may be the only indications.

Disseminated choroiditis with areas of white exudation, and even hæmorrhages, are sometimes seen; likewise retinitis with tortuous veins and blurred discs, and occasionally simple atrophy of the optic nerves, are met with in certain cases.† These intra-

* *Dowse, op. cit.*, p. 19.

† *Medical Ophthalmoscopy*, by W. R. Gowers, M.D., 1879, p. 203.

ocular lesions are owing to obstruction within the cranium producing compression from over-distension of the vessels or ventricles, congestion, hyperæmia, exudation, encephalitis, etc. Intense pain in the head with optic neuritis, according to Dr. Buzzard, is strongly suggestive of the presence of an intracranial tumour;* and if to these vomiting be also added, the diagnosis is confirmed. When such intense pain in the head is accompanied with optic atrophy and absence of patellar tendon-reflex, the evidence is in favour of a spinal lesion, the reflex not being lost as the result of cerebral lesions.† In congenital syphilis also, the brain or its coverings may be involved. If a child presents the symptoms of cerebral tumour, the condition of the front teeth should be inspected, and the eyes receive careful examination for traces of old keratitis or choroiditis. This may afford an important clue to the true nature of the case.

The mental phenomena presented by cases of cerebral syphilis are often peculiar. The complaints of headache may be vague and slight. The patient passes into a condition of stupor, more or less profound, or becomes aphasic, or absolutely maniacal. Most medical men of experience can call to mind cases of pains in the head and mental derangement cured by the exhibition of anti-syphilitic remedies.

* *Diseases of the Nervous System*, 1882, p. 147.

† *Op. cit.*, p. 149.

The following cases illustrate some important points in the course of the disease.

Case 1.—An officer, twenty-five years of age, in whom the syphilitic cachexia was well marked, came under my notice in 1859. The pains in the head (chiefly frontal) were the latest manifestations of the syphilitic poison, and were the chief cause of his quitting the service. For days together he suffered agony in his head, sometimes sitting for hours with his head thrown back and supported by his hands. He could not bear the slightest noise or excitement, and the simplest food would aggravate the pain by disturbing his digestion. Nothing gave him relief long together. The natural placidity and cheerfulness of his disposition were at length exchanged for moroseness, alternating with irritability of temper and outbreaks of passion. The attempt to change his position in bed, or to give food at the wrong moment, threw him into uncontrollable fury. On two occasions he became maniacal when opposition was offered to his extravagant wishes. To this succeeded great exhaustion, a feeble pulse, and a clammy skin; and sometimes nausea and vomiting were also present. For some days he would continue in a state of heavy stupor, from which it was as difficult to awaken him as to rouse a drunken man. He would turn his face from the light, knit his brows, and conceal his head beneath the bed-clothes. Eventually the condition grew worse, the cachexia increased, and the brain fell

into a state of syphilitic degeneration, producing hemiplegia, from which he partially recovered for a few months. Gradually the worst symptoms returned, he became more and more exhausted, probably from obstruction in the cerebral vessels, or lesion in one or more of the membranes, and died at the end of a year after his head was first affected. Until the paralytic symptoms came on the external surface of the head was always tender, and at times exceedingly painful.

Case 2.—This was a remarkable case of syphilitic headache. The patient was thirty-nine years of age when he came under my notice in 1867. He had contracted syphilis in a bad form about the year 1848, and took such an abundance of mercury that it profusely salivated him and greatly reduced his strength. Severe tertiary symptoms ensued, with nodes on the cranium and tibiæ, foul suppurating sores, and caries of the affected bones. Alarming epileptic seizures followed, accompanied by great irritation of the brain and membranes, and his life was often despaired of. On one occasion he was seized with pneumonia in the lower lobe of the left lung, with short cough and high temperature. At the end of a fortnight, from the commencement of the seizure, he coughed up nearly a pint of stinking pus, and from that time recovered his usual health. When the sores on the foot or leg healed, he would be fairly well, and go on for a time in comfort, enjoying his food and getting out in

the open air, but soon his headache returned, and he became irritable and desponding, and lost his appetite. When a sore discharged freely it favoured the escape of the syphilitic poison, and moderated the cerebral symptoms. Under the treatment usually adopted in these cases he so far recovered as to be able to follow his profession for years, but his habits became more irregular, and his craving for stimulants so increased that he died in 1877 from hæmatemesis and cirrhosis of the liver.

Treatment.—When the diagnosis has been correctly made, the headache often yields to appropriate treatment if it has not seriously impaired the blood-vessels and cerebral tissues. Delay in treatment, by favouring the advance of the disease, and by inviting serious complications, may render the disease irremediable. The state of the patient's health should be carefully inquired into, and his tolerance ascertained to bear specific measures.

The food ought to be nutritious and given at short intervals, and in the most digestible form, that exhaustion may be guarded against. The patient should be advised to take as much milk as possible, and to get out into the fresh air whenever he can do so. Stimulants are rarely demanded, and in my experience they constantly increase the headache and excite the circulation. The bowels require to be kept freely open, and a saline purgative answers well in most cases, as Friedrichshall or Hunyadi Janos

water. The character of the urine should be frequently ascertained, and at the same time the state of the liver, spleen, and lungs should be inquired into. Mercury in some form is generally demanded if the case is seen early, and it can be given safely in almost every instance. I have known the headache yield to mercury after resisting the iodide of potassium in every form and dose. Many cases of headache due to secondary syphilis have come under my care in which the bichloride of mercury with bark or gentian, or with the iodide of potassium, has had a most beneficial effect (Form. 37). If the perchloride of mercury be trusted to alone, it should be given with tincture of cinchona, or some bitter infusion, three times a day after meals. I generally combine with it a few grains of chloride of ammonium. The effect of the mercury is to increase the activity of all the tissues, to favour the absorption of hyperplastic matter, to relieve congestion of the liver and kidneys, and to render the urine free from albumen, if any be present, and the kidneys are simply congested. By giving an extra stimulus to the excretory organs elimination is encouraged, and the patient is placed under the most favourable circumstances.

It must be borne in mind, however, that many cases of syphilitic headache do not improve under the ordinary remedies. In such, the pathological changes are usually of a fibroid nature, the exuda-

tions having lost their early cellular character. This affords an argument for early and energetic treatment, lest permanent damage be inflicted on the nervous centres. Relapse is also but too common. When the more severe symptoms are dispelled, the physician should urgently impress upon the patient the importance of undergoing a long course of mercury, administered in such a manner as not to affect the health or digestion. The calomel vapour bath may be employed with advantage, or mild inunctions, and a sojourn at Aix-les-Bains, where mercurial treatment is combined with sulphur baths and hygienic measures, may be very advisable.

When neuralgia is present in some cases of syphilitic headache, I have known it yield in a remarkably short space of time to a combination of iodide of potassium, quinine, and arsenic (Form. 38).

In cachectic conditions mercury may be given with advantage and without detriment to the patient, if combined with iron (Form. 4).

Iodide of potassium is the next important remedy in these cases. When the headache is yielding to mercury, and there is no longer any necessity for continuing it, the salt should take its place. I invariably begin with a small dose, say two grains three times a day, in combination with bromide of potassium or sal volatile. Some patients cannot take a larger dose without experiencing iodism and

increase of headache. They cannot tolerate the drug in any dose, whilst others take it well. In every case the digestive system, if out of order, should be put right before it is begun. It may, however, be necessary to give it in full and continuous doses, and not abandon it till forty or sixty grains have been taken during the day, freely diluted with water, and after the principal meals. If it be hastily given up, the case may end fatally, when otherwise large and repeated doses may cure. "The average dose of iodide of potassium is from twenty to thirty grains three times a day, which is reached by rapid steps from six to eight grains given at first. The larger doses are necessary. I have repeatedly seen relapses, when the dose has been at ten or twelve grains, checked and cured by a rise to twenty-four or thirty-six grains. I have given a drachm every four hours for a short time, and one patient came to me who had for two or three months taken this quantity three times a day with advantage, under the direction of his family medical attendant, who had "bettered" my advice after a previous consultation with me. On the other hand, I have met with cases in which a single grain of iodide of potassium produced great depression and other injurious effects; in these one quarter or half a grain may do all the good, or iodide of sodium, or of ammonium, may be tolerated."*

* 'On Syphilitic Affections of the Brain,' by W. H. Broadbent, M.D.
—*The Lancet*, November 25, 1876.

occasionally happens that small doses of calomel (gr. $\frac{1}{10}$) every two or three hours relieve the pain, and prepare the way for the iodide.

With respect to local treatment, it may be advisable in some cases to have recourse to cupping at the back of the neck, if there be much occipital pain and stiffness, and pain over the upper cervical vertebræ. In other cases a seton has proved of use, as in the previous case just related, which had an excellent effect in relieving the headache and mitigating the frequency and severity of the epileptic seizures.

CHAPTER XIII.

ORGANIC HEADACHE.

A Rare Disease—Situation of Pain in Headache—Symptoms—Pain Continuous, Severe, and Paroxysmal—Vomiting and Optic Neuritis—Disorder of Motion and Sensation—Diagnosis of Organic from Functional forms of Headache—Intra-Cranial Tumours and Abscesses.

Causes—Blows on the Head—Chronic Osteitis—Unsuspected Fracture—Cysts—Hydatids—Exostoses.

Treatment—Value of Large Doses of Iodide of Potassium in all Cases of Cerebral Tumour, whether due to Syphilis or not—Rest to be procured by Bromide of Potassium and Hydrate of Chloral—If all Hypnotics fail, the Hypodermic Injection of Morphine to be employed—Cerebral Tumour treated by Excision.

ORGANIC headache (*Cephalalgia organica*) is called "Structural Headache" by Dr. Symonds ; but I prefer the term organic, because it is more clearly expressive of the grave morbid changes which provoke it, such as tuberculous, cancerous, or syphilitic tumours, hydatids, ossific formations within the cranium, softening of the brain, adhesion of the membranes, arterial degeneration, aneurism, obstruction of the sinuses, and so forth. But disease of the brain from any of

these causes may be present without our being able to recognize its nature or its extent, as in the case of the late Professor J. Hughes Bennett. A tumour may exist, and cause neither headache nor any cerebral disturbance, if the membranes are not involved, and inflammation does not ensue. When either of these results follows, then symptoms, which till then have been obscure and perplexing, are occasionally cleared up. The brain accommodates itself to pressure when it is gradual and brought about slowly; and thus the encroachment is not resented, owing to a new adjustment of the circulation, and balance of the various structures within the cranium.

Organic headache is rare. Out of three hundred cases of headache, of which I possess notes, I find only four that can be attributed to this cause. Dr. Gowers thinks it no exaggeration to say that for one case of headache arising from organic disease, we shall meet with fifty due to other causes.* With respect to the situation of pain in any headache we do not know for certain in what structure it originates. I have long been of opinion that it is not essential that the membranes should be pressed upon, irritated, or inflamed to provoke pain. Still it is difficult, as remarked by Dr. Tweedie, to explain in what manner headache is produced. In some persons the brain may be very anæmic or congested, or the seat of a morbid growth, and yet no pain be present. Dr.

* *Diseases of the Brain*, 1887, p. 140.

Gowers' views on this question appear very explanatory. "The dura mater receives temporary fibres, and, when inflamed, may unquestionably be the seat of pain. Only sympathetic fibres have been traced into the pia mater, but other organs which receive only sympathetic fibres may be painful when inflamed, and acute pain attends meningitis when the dura mater is but little affected. The cerebral substance seems, under normal conditions, to be destitute of sensibility; but from this fact the assumption has perhaps been too hastily made, that it cannot be the seat of pain when diseased. It should be remembered that the normal sensibility would not prepare us for the intense pain of peritonitis. In the brain, intense pain may be caused by very slight lesions which do not come near the surface."* It would seem, therefore, that we are not in a position to say that a morbid state of the cerebral tissue may not cause pain. I am of opinion that it does. The large vascular mass shut up in an unyielding bony case, and surrounded by membranes, is continually influenced in its dimensions by every beat of the pulse, and by every respiratory movement. If a sufficient quantity of blood be not sent to the brain, faintness and syncope ensue. The blood in many cases is forced up with difficulty by a weak heart, and runs down easily enough through the cervical veins. This explains how the brain may be starved of its proper

* *Diseases of the Nervous System*, 1888, vol. ii. p. 90.

supply of blood, and congestion in some part ensue from interruptions to the blood stream.

Symptoms.—The prevailing feature of organic headache is an abiding and continuous pain; it enters into every thought, and the patient lies in some obscure corner of the room, or in bed, hopelessly enduring his maddening pain, with the saddest and most miserable expression. He can do nothing, and think of nothing but himself. It is impossible to distract his attention in such a way as to convince one that he is ever entirely free from pain. The pain varies in degree, being sometimes mild, and at other times severe; it is almost always constant, though it may be paroxysmal, and, unlike the functional forms of headache, it prevents sleep; even when the patient is fortunate enough to sleep, he invariably wakes up with the pain. The slightest exertion, as walking, or stooping, or coughing, will aggravate the suffering; in fact anything which increases the blood pressure in the head. The pain may be frontal in whatever part the disease may be situated, whether in the cerebral hemispheres, the cerebellum, or in the occiput, or on one side of the head. When the disease is situated beneath the tentorium, the pain is generally felt at the occiput and back of the neck.* The headache alone is no positive proof of organic disease, though something may be inferred from its severity and persistency; but, as

* *Diseases of the Nervous System*, 1888, vol. ii. p. 89.

Gowers observes, "the chief significance of pain in the head is derived from its associations." *

Vomiting and optic neuritis are commonly associated with organic disease of the brain, but these symptoms are not absolutely pathognomonic, as the two occasionally occur in some cases of anæmia and kidney disease. But, as already stated, when intense pain in the head is associated with optic neuritis, it is very significant of an intra-cranial tumour.† The vomiting and sudden retching come on without any obvious cause, or any disorder of the stomach, or errors in diet, and the acute internal pain continues notwithstanding. These symptoms are sometimes accompanied by a quick and irregular pulse, by spasmodic contractions of the limbs, or by alteration in their sensibility. The tongue is generally clean and the bowels are costive. Before pain is complained of, there is sometimes impairment of function, as in the case of a small tumour or softening at the origin of the third nerve; and thus we derive important and conclusive evidence of the situation of the lesion when the patient does not complain of any sensation of headache and is still able to follow his duties. Yet, on the other hand, a tumour has been found to occupy the centre of one of the hemispheres of the brain, or of one of the ventricles, and to cause no disorder of motion, or special sensation, no failing sight,

* *Diseases of the Nervous System*, 1888, vol. ii. p. 89.

† See Chapter XII., p. 303.

no impairment of intellect, no threatening palsy. Pain in the head is generally the chief and constant symptom of organic headache, sometimes intermitting, sometimes coming on in paroxysms, and most probably dependent on varying conditions of the cerebral circulation. Paroxysmal pain is often felt in organic disease of the brain from the liability of nervous pain to take on this feature ; but if pain is intense and continuous, and is referred to one particular spot, some organic lesion may be suspected. The headache which never yields for a moment to any treatment, may be generally put down as organic. As the disease advances, the face becomes changed and expressionless, the brows are contracted, the pupils are large, or one is larger than the other, and there is sometimes a slight squint or ptosis, although the latter is occasionally seen in some nervous headaches, when the patient has been subject to severe mental strain, or disappointment in business speculation. When these symptoms have their origin in organic disease, they go on increasing till the patient is seized with a convulsion, or dies comatose.

Diagnosis.—A great deal has been said and written on the character and situation of the pain in the head to establish a diagnosis, but this is unreliable. The history of the case, with its chief features and progress, are of the greatest assistance. There is something in the aspect of the patient, who is suffering from organic brain disease, which is almost charac-

teristic ; there is a despair about him, animation is gone, and his walk and manner are altogether different to that which is observable in the ordinary forms of functional headache ; for however severe the latter may be, there is seldom that indifference and lack of interest which we witness in organic disease of the brain. Dr. Gowers says, "If you can exclude three constitutional states—considerable anæmia, kidney disease, and lead poisoning—the coincidence of considerable neuritis and headache may be regarded as proof of organic intra-cranial disease." *

Dr. Hughlings Jackson is of opinion that frontal headache is generally due to abdominal affections, vertical headache to cerebral disturbance, and occipital headache to anæmia. I am quite sure that the first-named variety is common enough in the sympathetic headache of liver and stomach disorder, especially after indulgence in stimulants ; vertical headache is frequent in the headache of cerebral anæmia, and occipital headache occurs in ovarian disturbance, and in the various forms of nervous headache. In some congestive headaches and that arising from Bright's disease, the pain over the occiput may be throbbing and deep seated, and not superficial as in the nervous and neuralgic forms. The pain arising from organic disease may, especially in the case of cerebral tumours, be referred to all parts of the head, and this pain may exactly simulate that which is of

* *Diseases of the Brain*, 1887, p. 150.

no less serious origin from other causes. The mere description of pain given by the patient is no help towards drawing a conclusion as to its nature, for it may be slight or severe, continuous or paroxysmal ; it may be attended with vomiting, and with many of the symptoms belonging to the different varieties of functional headache. The pain of organic headache is marked by its severity and its constancy, any part of the scalp may be tender, and if the pain occurs in paroxysms the patient may be seen to press his head with open hands, as if to support and steady it. The most intense pain, as Dr. Bristowe remarks, which is then usually very limited in its seat, is caused by the pressure of intra-cranial tumours, or abscesses upon sensory nerves.* Dr. Walshe's experience concerning the diagnosis of a cerebral tumour is much to the same effect. He says, " The circumstances most distinctly permitting the physician to affirm that a tumour exists within the cranium are—the existence for a considerable period of intense cephalalgia, especially if limited to a fixed point, or even to one side of the head, and if attended with repeated vomiting ; of convulsive movements without paralysis, but followed by mere weakness, or actual paralysis of the affected parts ; of different affections of the organs of sense, especially alteration of sight ; and of disturbance of intellect, while the general health does not very materially suffer." †

* *Theory and Practice of Medicine*, 1876, p. 942.

† *The Nature and Treatment of Cancer*, by W. H. Walshe, M.D., 1846, p. 495.

It is obvious that the pain, as a rule, varies according to the size and seat of the tumour, and the pressure to which the several nerves are subjected ; but when it is remembered that a tumour may attain considerable magnitude before it causes pain or inflammation, the subject of diagnosis is confessedly obscure. Dr. Abercrombie relates a class of cases, which are often mistaken for periodical or sick headache, the pain not being urgent enough to invite attention to the head as the origin of the mischief, but to the stomach as the supposed offender. After death the chief morbid appearances are found in the cerebellum. There are cases, too, in which giddiness, failing muscular power, loss of sight and recollection, are the chief features ; but there is no headache whatever, and exemption from it may be possibly owing to degenerative changes in the nervous tissue, rather than to pressure on membranous structures, and congestion of the cerebral vessels.

Organic headache, then, is distinguished by the continuance of the suffering, which either extends over the entire brain, or is deeply seated in one spot. It occasionally resembles the congestive form of headache from over-distention of vessels, which is so frequently present ; though some cases exhibit pallor and anæmia, with much pain. Some years ago a man, aged forty, came under my care, who suffered the most excruciating agony in the vertex and left side of the head, from which he never had a moment's respite, and his

agony was so acute that he longed for death. Though there was at no time of his early illness any symptom of paralysis, or loss of memory or sensation, it was conjectured that he was suffering from disease of the brain, because the pain was continuous and fixed, and his expression vacant and desponding. His forehead was wrinkled, his brows were contracted, and his eyes had lost all animation. In the course of a few weeks, whilst under observation, delirium came on, accompanied by vomiting, and inability to retain any food on his stomach. These symptoms continued, and he fell into a comatose condition and died. After death a cancerous tumour was found in the left hemisphere, extending posteriorly and downwards to the margin of the left lateral ventricle, but not to the deeper structures at the base of the brain.

The presence of febrile symptoms, with rigors and high temperature, where there is pain in the head, would help us to the diagnosis of organic change within the cranium, as in tubercular mischief, or the formation of an abscess. When headache in a young adult man comes on with symptoms approaching convulsion, or an epileptic seizure, and there is any amount of facial paralysis or thickening of speech, it is suggestive of organic origin, and more specially so, if there be any history of syphilis. If vomiting be added to the list of symptoms, it is all the more likely, particularly if no relief follows, which generally does follow if the headache be due to gastric disorder. It comes on

suddenly, and the patient may be able and willing to take food immediately after the contents of the stomach have been expelled.

Organic headache is witnessed in softening of the brain, where the blood vessels are diseased from atheromatous deposit. In a female patient, aged seventy, who was under my care in 1875 for this headache (which she described as unceasing and occupying the whole frontal region), there were present most of the symptoms which accompany disease of the brain, such as depression of spirits, the apprehension of some impending calamity, and gradual failure of the intellectual powers. No treatment was available in removing the headache, and the patient died in about a year after coming under treatment. In this case, as in many similar cases, there was more confusion of ideas than pain.

In 1867 a gentleman, aged seventy-four, consulted me for frontal headache, which was so overpowering, that in my presence he often wished for deliverance by death. He had had two slight apoplectic seizures in 1866, due to cerebral hæmorrhage. There was atheromatous change in this case, and the radial and temporal arteries gave indications of hardness and tortuosity; depression of spirits and irritability of mind and manner were also noticeable features of his changed condition. After dinner the headache was generally relieved by a larger quantity of wine than was allowable, and next morning the

pain and confusion of ideas were increased. In this case much relief was obtained by carbonate of ammonia and calumba (Form. 54), and by valerianate of zinc and hop in the form of a pill (Form. 105), and ammonia and tincture of lavender (Form. 55). A few months before his death, in August, 1868, from sudden apoplexy and hemiplegia, he had quite lost his headache, and the condition of the brain did not appear worse until the time of his fatal illness.

Causes.—Among the causes of organic headache, a blow on the head, received at an early period of life, may eventually provoke a change in the vessels which leads to organic disease. A slow insidious congestion or inflammation may end in mischief by causing a local pressure, impeding the circulation in some parts, and increasing it in others. A blow on the head may also produce localized chronic osteitis or meningitis, unsuspected or depressed fracture, and the possibility of relieving these conditions by the trephine, should always be considered. I must not omit to mention the agonizing headache followed by delirium and stupor, which is associated with the function of acute intra-cranial abscess due to the spread of inflammation from necrosed bone, especially in the neighbourhood of the temporo-sphenoidal lobe, from caries of the petrous bone. Of sixteen cases of tympanic disease and cerebral abscess which came under the care of Mr. Wheeler, fourteen operated upon recovered, and two died.*

* 'Trephining in Cerebral Disease.'—*Lancet*, August 13, 1878.

Dr. Moxon and some other writers consider that the organic causes of great headache are never diseases of the proper nervous tissue, but of the textures that envelope it.* From what has been said I think that this admits of some doubt. It must be remembered that we are not dealing in the proper sense of the term with a symptomatic headache, one that is nervous or congestive, rheumatic or gouty, but with one due to organic change within the cranium, and in striking contrast to all these varieties.

Cephalalgia occurs less frequently in organic affections of the intra-cranial contents than is generally supposed. It is well known from clinical experience that, except in certain affections of the cerebellum, there is no definite relation between the site of the disease and the site of the pain. Taking the diseases of the cerebrum and cerebellum together (apoplectic and non-apoplectic cases), furnished by Andral and Dr. Abercrombie, "we find that the ratio in which headache is a concomitant of organic disease of the brain is as 92 to 38, or nearly as 3 to 1; while by eliminating the apoplectic cases, we obtain the still higher ratio of 74 to 15, or nearly 5 to 1."† "In twenty cases of fungus of the dura mater, published by Louis (*Mém. de l'Acad. Roy. de Chir.*, t. 5), there were only three with cerebral symptoms of any kind ;

* 'On the Treatment of Headache from Intra-cranial Disease.'—*Lancet*, 1875, p. 750.

† 'On Chronic and Periodical Headache,' by Sir E. H. Sieveking, M.D., F.R.C.P.—*Medical Times and Gazette*, 1854, p. 181.

and chronic abscesses, cysts, hydatids, exostoses, etc., have often arrived at an enormous size without having produced any serious alteration in the functions of the brain." *

Treatment.—In any severe and protracted headache an ophthalmoscopic examination should be instituted at once. Here our first steps are to ascertain what is the cause of the headache, and in what way we ought to proceed to arrest the inflammation or the pain which has been set up. Dr. Moxon considers that organic headache occurring in the earlier decades of adult age demands large doses of iodide of potassium, and that it even yields to this drug when not of a syphilitic nature. It must be evident, as he says, to most observers, that syphilis may affect the system without our being able to trace any hereditary history of it, or to find any evidence of it on the skin or bones of the body. When the iodide does afford relief to the suffering, I am strongly inclined to think there is some undiscovered syphilitic taint, for I have seen many cases of confirmed headache, supposed to be due to organic change, both in young and old persons, who have derived no advantage from the drug; on the contrary, the pain has increased under its use. In one case of syphilitic headache, the iodide, which gave relief at first, failed altogether in the latter period of the patient's life; and in another case

* *Tweedie's Practical Medicine*, Article 'Cephalalgia,' 1840, vol. ii. p. 154.

the drug made the patient much worse at first, but better afterwards. It may be given in small doses, sometimes combined with the bicarbonate of potash and small doses of sal volatile (Form. 56); but as many as forty or sixty grains should be given in the course of the day, if there be a suspicion of syphilis and the pain is continuous.* Dr. Smith recommends iodide of potassium in all cases of headache due to cerebral tumour. If the growth depends on syphilis, it may cure the condition entirely; and, if not, it has been known to relieve the pain and local congestion induced by other swellings, so that the remedy is worth a trial in all cases that appear obstinate.

Bromide of potassium and hydrate of chloral will be necessary to procure rest if the patient is wakeful and can obtain no sleep; but if these remedies fail, with other suitable hypnotics, as croton-chloral hydrate, and cannabis indica, then the subcutaneous injection of morphine may be tried, and the observations I have elsewhere made are also applicable here.† Dr. Moxon found that gr. $\frac{1}{5}$ of morphine, used hypodermically, gave relief in a syphilitic case after the iodide failed; but he urges caution, from its liability to produce insensibility; and, apart from the possibility of this contingency, it does induce very serious depression and mental disturbance in some persons, even when the operation is carefully performed and

* See Chapter XII., on Syphilitic Headache.

† See Chapter VI., on Nervous Headache, p. 199.

the quantity used very small. When the pain is severe and yields to nothing else, it ought to be tried.

If relief does not follow medical treatment, where a tumour can be diagnosed, and is within reach, surgical means ought certainly to become the subject of consultation. A very remarkable case of cerebral tumour treated by excision, without any immediate injurious results, the patient living for weeks after it, was brought before the Royal Med. Chir. Society, by Dr. A. Hughes Bennett, in May, 1885. The patient was a farmer, twenty-five years of age, who consulted Dr. Bennett for some paralysis of the left arm in the autumn of 1884. He had good health till 1881, when he was struck on the left side of the head by a piece of falling timber, which knocked him down. He thought he lost consciousness for a few minutes, but was soon able to proceed with his work. Occasional headache ensued, and a year later he felt twitchings on the left side of his face and tongue. These became worse, and were followed by a fit, preceded by an "aura," running down from the left side of the face and neck to the left arm and leg. Twitching of the face and slight convulsions continued for two years and a half. This was followed by twitching of the left hand and arm, alternating with the affection of the face. In October, 1884, there was frequent acute pain in the vertex, but there was nothing abnormal in the scalp, or in the movements

of the eyes. Sight was unaffected, but there was double optic neuritis. The tongue was protruded a little to the left. There was complete paralysis of the left hand and wrist; the elbow could only be moved a little, and the shoulder not much more readily. The left leg was weak, and the knee-jerk and mechanical irritability of the muscles were most marked on the left side. The acute headache was attended by occasional uncontrollable vomiting, lasting for several days. The twitchings were sometimes in the face alone, sometimes in the arm alone, but never in the leg alone. The symptoms led to the diagnosis of a tumour in the brain, involving the cortex, or probably limited to the neighbourhood of the middle third of the fissure of Rolando. On the 25th of November, Mr. Godlee trephined, and removed a part of the bone over the upper part of the fissure of Rolando. The dura mater was incised, and a glioma found below the surface, which was completely removed by a Volkmann's spoon. For four days after the operation there was neither pain, vomiting, nor convulsions, the general health and intelligence remained intact, and the pulse and temperature were normal. After this a hernia cerebri began to appear, and it slowly increased till it reached the size of half an orange. Notwithstanding this, the patient's condition was satisfactory. He was cheerful and hopeful, he suffered no pain, his appetite was good, and the pulse and temperature continued normal. The favourable condition lasted

for twenty-one days after the operation, when the patient was seized with a rigor, followed by meningitis, and death after a week's illness. The immediate cause of death was local meningitis, the result of septic matter from the wound in the brain having infiltrated the neighbouring tissues and gravitated downwards towards the base of the skull. The conclusion arrived at was that the operation removed all the painful and distressing symptoms, without causing any injurious effects on the general health, or nervous system of the patient. In the discussion that followed, Dr. Hughlings Jackson said that in case of convulsions limited to one arm, or beginning in one leg, with some persisting local paralysis, and double optic neuritis, he should diagnose tumour, or some other such gross disease of the upper part of the Rolandic region, and should consider the propriety of trephining. Dr. Ferrier said if antiseptics were employed, inflammation need not result. Besides, leaving this case entirely out of consideration, it appeared from the correspondence which its publication elicited, that a few other cases of cerebral tumour have been operated upon with the most satisfactory results to the patients.* Through the experimental investigations of Hitzig, Ferrier, and others, a tumour in the brain was diagnosed, and its situation localized. The case just related goes to prove that the skull may be trephined

* 'Case of Cerebral Tumour.'—*Med. Chir. Trans.*, vol. lxxviii. p. 243.

and portions of the brain safely removed under anti-septic precautions.

Mr. Victor Horsley has recorded some cases of brain surgery in which nine of the ten cases were considerably benefited. He administered the one-twentieth part of a grain of morphine before giving chloroform, and this drug seems to have the effect of contracting the cerebral arterioles and diminishing the hæmorrhage during the operation.* A detailed account of the methods of operating in these cases belongs to the category of surgery. It may not be amiss to note, however, that before submitting a patient to so serious a proceeding as the opening of the cranial cavity, both physician and operator should satisfy themselves of the localization of the supposed tumour, and of the impossibility of relieving the symptoms by the judicious use of other remedies. It should ever be borne in mind, too, that multiplicity of formation is a common occurrence in cerebral tumour, and signs indicative of this would certainly negative surgical interference.

* 'Ten Consecutive Cases of Operations upon the Brain and Cranial Cavity to illustrate the Details and Safety of the Method Employed.'—*Brit. Med. Jour.*, April 23, 1887, p. 863.

CHAPTER XIV.

HEADACHES OF ADVANCED LIFE.

THESE can scarcely be separated from the headaches of organic disease, there being in all likelihood some change of structure ; the vessels become brittle and atheromatous, and the circulation through the brain is impeded and deficient. In some persons of full habit, who are advanced in life, the headaches are of a congestive type, and therefore any excitement of the circulation, as over-eating, or too great indulgence in stimulants, may cause the vessel to rupture, and so an apoplectic seizure be induced ; for, the brain having undergone softening change through the failure of nutrition, the withdrawing of this support renders the vessels exceedingly liable to rupture from any sudden strain which may be put upon them. In cases of headache dependent upon cerebral softening, the suffering is less acute than in most other of the organic varieties, and irritability and fits of depression are more common. Dr. Herbert Major demonstrates that the large nerve cells are in a state of granular

degeneration in senile atrophy of the brain, and that the smaller cells are simply atrophied without degeneration.* It is highly probable that many of the morbid changes found in senile atrophy of the brain are the cause of the headaches of advanced life, and also those headaches which we ascribe to organic change. We cannot expect that we shall find anything at all constant in character with the various morbid conditions of the brain.

Treatment.—If there is a tendency to congestion about the head, it should be controlled by those remedies which naturally suggest themselves to the practitioner. A mild aperient and cold sponging the head will be found serviceable (Form. 81). In the case of an old gentleman patient who had confirmed headache from cerebral degeneration, I found that a large sponge filled with cold water, and allowed gradually to empty itself over the top of the head, night and morning, gave more relief than any other remedy that was tried; it calmed the excitement, promoted sleep, and so refreshed the patient, that he was able to walk a short distance with comparative comfort after it. When cold is thus locally applied, it has a tonic and invigorating effect. By contracting the vessels and lessening the supply of blood to the brain, it retards the cell growth and other degenerative changes in the tissues.

* 'Observations on the Histology of the Morbid Brain.'—*West Riding Lunatic Asylum Reports*, 1874, vol. iv. p. 22.

Ergot of rye is a useful remedy, and has been given with benefit in these cases. It causes contraction of the vessels through its influence on the sympathetic system, and our experience of its efficacy in the treatment of uterine hæmorrhage and hæmoptysis, entitles it to a most prominent position among styptic agents. Twenty to thirty minims of the liq. extract ergot, in water, with a few drops of spirit of chloroform, three times a day, is a fair dose (Form. 57), but Dr. Smith* recommends much larger doses. He begins with one drachm of the same preparation, and increases it to half an ounce three times a day (Form. 58). If the theory is correct regarding the action of ergot, these large doses are not advisable. In small doses it is known to contract the arterioles very considerably, but in large doses it leads to exhaustion and subsequent dilatation. Judging from the headache which it sometimes induces when used in menorrhagia, smaller doses are preferable, and in most cases they will be found equally effectual. If these measures fail to afford relief, and the patient is in so much pain that sleep cannot be obtained, opium alone, or one of the bromide mixtures must be resorted to, and in doses full enough and as often repeated as the urgency of the case appears to warrant.

* 'Therapeutics of Headache,' by A. A. Smith, M.D. A Lecture delivered at Belle Vue Hospital Medical College.—*Medical Record*, September 15, 1876.

The action of ergot is further alluded to in Chapter II., p. 83, on the Headache of Cerebral Hyperæmia.

If there is confusion of the mind, frontal headache, and sleeplessness, the hop and valerian pill may be found useful (Form. 105), and if the appetite is poor, carbonate of ammonia, with tincture of lavender and calumba, may be taken with advantage (Form. 55). In a case, which came under my care many years ago, this plan of treatment afforded great relief, and the patient lost his headache almost entirely for six months whilst following it, and living in a quiet country place. On returning to London, where he was harassed and worried, tinnitus aurium set in, and the mind became more confused than at any previous time of his illness. These symptoms were soon followed by hemiplegia and apoplexy, which terminated fatally in a few hours. The late Sir George Burrows once told me that a favourite prescription of his for old people who suffered from low spirits and gloomy apprehensions, was the compound tincture of ammonia (Eau de Luce—spiritus ammoniæ succinatus) combined with tincture of lavender and calumba (Form. 55 *a*).

A favourite and similar mixture at one of the old London hospitals is very useful in cases of nervous exhaustion and flatulence. The physicians of the institution often took a dose before commencing a lecture (Form. 55 *b*).

Urethane, recently introduced to the profession, is said sometimes to prove a valuable sedative and hypnotic, producing calm and natural sleep without

causing any disagreeable effects, as nausea and constipation, which frequently follow the exhibition of opium or morphine in any form. It has been given by some physicians very successfully in a variety of cases where there is an absence of pain and excitement, and where morphine and chloral are contra-indicated. I have not prescribed it often enough to pronounce a judgment on its therapeutic properties; in a few cases it provoked sleep, and appeared to answer well. It may be given in solution with a little syrup of orange, or in the form of "tabloids," from one to three swallowed in a little water. Each tabloid contains five grains of the drug.

The treatment also comprises fresh air, light food, and cheerful conversation; for there is a risk in confirmed cases of the mind becoming so weak, that the patient may end his days in a lunatic asylum.

CHAPTER XV.

HEADACHES OF CHILDHOOD AND EARLY LIFE.

Preliminary Remarks on the Significance of Headache in Children—Their insidious Course and Character—Hereditary Disease—The Resemblance in Physical Form and Features to the Parent are not more constant than Mental Peculiarities—Importance of checking the Transmission of Disease—The Life of Childhood contrasted with that of the Adult—Brain of Childhood compared to that of Maturity—Mental Development compared with Physical Growth—Their Relationship and Bearing on Health—Effects of Illness on the Functions of the Brain—Parents entail Disastrous Evils on their Offspring by forced Mental Discipline—Difference among Children in the Power of Memory, and Acquirement of Knowledge—Case of Arithmetical Power related by Carpenter—Evil Consequences of the Forcing System—Hypertrophy of the Brain—Popular Tradition of delayed Mental Training—Professor Laycock's Opinion that Precocious Children are generally Strumous.

The Chief Varieties of Headache in Children—1. Cerebral Headache. 2. Sympathetic Headache. 3. Congestive Headache, including Febrile Headache. 4. Headache from Anæmia, Neuralgia, etc., constituting Nervous Headache. 5. Headache depending on some Intricate Change in the Cerebral Membranes or Tissues of the Brain. 6. Organic Headache.

HEADACHES hold such a prominent position in the diseases of childhood, as to constitute them worthy

of special notice and consideration. There are few practitioners of any experience who have not had reason to lament the overlooking of the first symptoms of brain mischief in a young child. No fever, no vomiting, no thirst may have been present to arrest attention ; the symptoms may have been entirely subjective, and yet in a few hours the child has been struck down by a convulsion, and forthwith meningitis has followed. No parent should neglect a headache in any child under thirteen or fourteen years of age, especially in girls about this period of life, when physiological changes are in active progress.

The conventional usages of modern life, in regulating the education of children, have a tendency to push them forward without sufficient regard to physical training, the acquisition of knowledge being considered of more moment than the vigorous growth of the body and the stability of the frame. The influences which develop the general strength, and produce strong muscles and sound limbs, are counteracted in their good effects by the undue pressure which is put upon the brain when it is least able to bear the tension, and nature is thus thwarted, and her wise counsels are defiantly ignored and set aside. "No perfect brain ever crowns an imperfectly developed body. When Michael Angelo reared St. Peter's Dome in the air, he made every stone beneath contribute, not only to the use and beauty of the part he put it in, but to the support and power of

the Dome. The brain must be built up in connection with the building of the rest of the body, remembering constantly that the imperfections of the latter reflect themselves upon the former." *

In bringing up a child, the object should be to direct the mind into a healthy channel that it may grow and develop naturally with the body. Fröbel says, "the child must be helped to produce what is within it." It should be encouraged in its innocent amusements, in building houses with bricks and cubes, that the hands may grow deft and steady, and the eye become accurate. In this way the latent faculties are gradully unfolded and called forth without effort. Rousseau has truly remarked that "a child forgets what it has been shown, it never forgets what it has *made*."

Parents incur a heavy responsibility in enforcing a course of study, or a system of training, which is likely to induce disorders from which they suffer themselves. The resemblance which a child bears to the parent in outward form and feature, ought to teach us how transmissible is every taint and peculiarity, which it should be our constant desire to avoid and to arrest. Some faulty conditions of the blood, and of the different fluids of the body, may be nearly stamped out by careful regimen and appropriate management, as we have seen exemplified in some members of a family who have been reared differently to the rest.

* *The Building of a Brain*, by E. H. Clarke, M.D., 1875, p. 21.

But asthma, emphysema, the hæmorrhagic diathesis, tuberculous diseases, and many affections of the skin, have a congenital origin, and here structural disease is as frequently owing to a transmitted tendency, and to a peculiar state of the blood and bodily temperament, as the family outline of the figure and face. Amongst the disorders of the brain and nervous system, it must be admitted that headache is an affection more frequently hereditary than almost any other. So strong is inheritance, that the nervous and excitable manner of the parents stand out prominently even where the children have been brought up at a distance from home, and when their surroundings have been entirely changed. "There is much that is curious in the tendency to headaches thus transmitted by descent, and often going through whole families with similar character. The causes here presumably vary in different instances. Sometimes, and especially perhaps where they are periodical, the affection may belong to the gouty habit, and to the matter of gout in the circulation. In other cases abnormal structure of the vessels of the head may be concerned; in others, again, some peculiarity in the nervous system itself." * These considerations should counsel prudence, and control the agencies at work which threaten domestic peace. Surely the cautious parent ought to consider the cheerful or melancholy tem-

* *Medical Notes and Reflections*, 'Hereditary Disease,' by Sir H. Holland, Bart., M.D., F.R.S., 1855, p. 37.

perament of his child, the mental as well as the bodily strength, and be guided in his management accordingly. The gains and losses in life, the competition and the struggles, should not be obtrusively thrust before him, for the mind will realize early enough the bitter lessons of material existence. How different is the life of childhood from that of the adult! It is the existence, as it were, of another creation; life is wrapt up in the present, and not in the future.* A child lives for himself, and not for others: his keen sensibilities move him to sorrow and to pain with great quickness: his weak reasoning power is counteracted by the activity of his imagination. He feels intuitively the approach of a friend, and knows his foe in an instant. His life is not one of mingled sorrow and pleasure; it is all one, or it is all the other—the past lights up no remorse, the future has no sorrowful forebodings. How fruitful of evil is the tyrannical oppression of the unsympathizing parent or guardian of a child, who exacts from him thought and conduct beyond his years, and, with restless caprice, despotically moulds his actions.

The weakening more and more of the overtaxed brain lays the foundation of nerve exhaustion, and disorders are induced which years may never overcome, even if the defective nutrition of the brain

* "Children are heedless alike of the past and the future: the present is enough for them."—La Bruyère.

does not lead to those pathological changes which affect the blood vessels and cerebral cells. The symptoms which announce these alarming evils are fits of recurring mental excitement, evidencing exhaustion in the functions of the brain. The amount of exercise which ordinarily maintains this organ in health now impedes the harmony of its actions, and henceforth invites those changes, which the naked eye too plainly detects in some cases, while scientific methods of research are alone capable of revealing them in others.

In ignorance of possible evil, children are pushed forward too much, fretfulness of mind is implanted, and general debility takes the firmest hold of their constitutions in the springtide of life. When a child is growing it needs fostering care, and all its reserve store of energy, in order to approach completeness of development. If at this time it sustains damage, or injury of any kind, and one link is broken in that mysterious chain of vital forces which keeps the whole fabric in order, then the health in too many instances is appreciably undermined, and life is absolutely shortened. A closely defined plan of study carried out in defiance of the laws of health often leads to a delicate manhood. "Study and student-work aid this evolution ; but, as we have seen, they are not the only factors of brain-building. Cerebration is brain-exercise ; and brain-exercise strengthens and develops the brain. But the brain is evolved from the organiza-

tion, and, unless the latter is normal, the evolution is imperfect. Moreover, physiology informs us that conscious, or more properly speaking, volitional cerebration, should not be attempted too early in life. In Nature's order, the nervous system of an individual is the last to attain its full development; and, of the nervous system, the cerebral ganglia reach maturity later than any other part. Obviously the latter should not be put to work till they are capable of labour. Without exercise an organ will attain little or no development: excessive or premature exercise will monstrously develop it—in either case to the injury of the rest of the organism.* But it is worthy of consideration that the judicious culture (within appropriate limits) of the mind in early life, gives the child so trained an immense advantage over another less fortunate. He retains more after a lapse of time, because his previous knowledge calls up something familiar and already acquired which bears on the subject in hand. This holds good through life, and it is only necessary to furnish him with fresh facts, and new combinations and impressions will be easily engrafted upon the recollection. Every skilled workman from his previous training is rendered capable of acquiring an increase of knowledge from the resemblance of the present to the past, the past coming back to him when a similar subject is again presented to his mind, however remote the connection may be.

* *The Building of a Brain* by E. H. Clarke, M.D., 1875, p. 44.

The power of acquiring knowledge or of forming habits is particularly strong in childhood, when the mind is flexible and plastic. Of all periods of life, then, this is the one when impressions are most likely to become enduring, and the habit of concentration to be acquired—a period when the capacity of the brain should be carefully estimated, and the organ not pushed to dangerous excitement, which in the growing stage is more pernicious than complete disuse.

The development of the human brain, like the wonderful organization of the whole animal kingdom, is a subject of peculiar interest, proceeding on that grand and harmonious design which the Almighty has instituted throughout the universe. If the facts which spring from a study of vital phenomena are carefully searched and scrutinized, we shall trace the connecting link between the physical and the intellectual parts of our nature, and be in a better position to understand their mutual dependence on one another. In the earliest periods of foetal existence, when life is just beginning to dawn, there is nothing like nervous matter, those parts corresponding to the head consisting of merely a limpid colourless fluid. The corpora olivaria are not formed till the seventh month, and at the period of birth the optic thalami and posterior ganglia of the cord are sunk amid the substance of the hemispheres (Solly). The complicated structure of the nervous system reaches perfection in the adult brain only.

An adult brain may stand an excessive amount of overwork if the physical strength is robust, but a child cannot endure immoderate exercise of the mental powers without soon breaking down, unless there is strong bodily health also. We are willing to admit the force of an argument held by those philosophers who have closely analyzed the subtle powers of mind, and have examined what it is capable of achieving. It is unquestionable that the reasoning powers are never completely developed if education is neglected or imperfect. The brain requires exercise or it will waste, and the moral strength will decline also, if intellectual culture is abandoned. Take the case of two members of the same family starting in life with an equal capacity of mind. The exercise of one brain, let us suppose, is complete and methodical, that of the other is entirely neglected. The first youth will grow up strong and vigorous in intellect, and be anxious to carry out with justice and honour the responsibilities of his situation; whilst the actions of the other are governed by selfish and ungenerous motives, or the ruling principle of his life is caprice.

No human being is so constituted as to be above physical considerations; the closeness of the connection must be apparent to all who reflect on the question for a single moment. The brain of a person whose bodily health is hereditarily weak, or who has been subjected to depressing influences, will evince earlier and greater indications of weariness than it

would do if the physical conditions had been different, and the brain supplied with healthy blood.* Can a child who has recovered from fever, or an exhausting illness, prosecute his studies at once with the same delight and ease he did before the attack? A considerable length of time must elapse before his digestive system is strong enough to assimilate sufficient nourishment to restore the exhausted energies of the brain. We know his mental condition as he approaches convalescence. He wakes in the morning after refreshing sleep, and is lively with his toys and amusements; then suddenly he becomes petulant and irritable over them, throwing them on one side in anger and disgust, till he falls off to sleep, and the jaded brain is restored. The mental faculties have sustained a shock by the illness, and the disease has impaired or temporarily suspended the powers of memory, and obliterated recent impressions. What he does acquire is easily forgotten, till the brain is restored to its former strength. Some years ago, I had under my care a little boy, two years of age, who recovered from meningitis after

* The brain is clearer in vigorous health than it can be in the gloom and misery of sickness; and although health may last for a while without renewal from exercise, so that if you are working under pressure for a month the time given to exercise is so much deducted from the result, it is not so for the life's performance. Health sustained for many years is so useful to the realization of all considerable intellectual undertakings, that the sacrifice to the bodily well-being is the best of all possible investments."—*The Intellectual Life*, by P. G. Hamerton, 1873, p. 28.

many months of shattered health. When he reached the age of seven, and was strong in his limbs, an attempt was made to teach him to read and write ; and it was found that he could give his attention for about ten minutes at a time, and that then he began to tire. At first this was ascribed to idleness and inattention, but it was soon found that perseverance in the attempt caused headache, pallor of the face, and disinclination for food ; his nights were restless, and it was obvious that the continuance of the plan would be fraught with danger. His memory was not retentive, and it was more than probable that were the system continued in years to come, the brain would never be able to master more than the most ordinary details of elementary knowledge. The shock sustained at the time of the illness had impaired the cerebral tissue, and damaged the mental powers.

“Dr. Pritchard, on the authority of the late Dr. Rush, of Philadelphia, mentions an American student, a person of considerable attainments, who, on recovering from a fever, was found to have lost all his acquired knowledge.” At length, when his health was restored, “his lost impressions suddenly returned to his mind, and he found himself at once in possession of all his former acquirements.”* I have known some of the worst forms of headache supervene on acute illness, and continue when the attempt to

* *On the Intellectual Powers*, by J. Abercrombie, M.D.

resume study was made. A boy, thirteen years of age, who had a tedious attack of typhoid (in which the cerebral symptoms were considerable), always suffered from severe headache when he attempted to resume his studies, and the inference I drew from the protracted stupor and heaviness, was that the brain tissue had undergone some permanent change, and that if the course of study was continued after this warning, his memory would be irretrievably damaged, and that he would possibly pass into a state bordering on idiocy.

The privation of active exercise, and light amusements for children, by enfeebling the digestive and assimilative functions, impairs the quality of the blood, and thus disturbs and lowers the cerebral functions. The nervous symptoms shown in petulance and irritability should be serious warnings, though they are too frequently overlooked, or attributed to a wrong cause. A headache traced to confinement and study is a familiar example of this over-cultivation of the intellect, and in every instance where it arises, the studies should be cast aside, and recreation substituted. Absolute brain repose is an urgent necessity in these cases, and the greatest literary workers in all times have sought hours of indolence to recruit their exhausted energies, and win back sleep to their worn-out intellects and wearied bodies. "There appears to be a kind of sleep in which no mental action whatever takes place, so that the only

central organs in operation are those of an automatic and reflex nature. The functions depending upon the central organs of this character, viz. circulation, respiration, secretion, digestion, etc., go on as usual." *

Moderate occupation of the mind is healthy and beneficial; excessive work is nothing less than a curse. Both independent and prudential considerations impress us with the conviction that no plausible reasoning can support the views of abstruse thinkers, who delude society by advocating schemes for education, which press so hard upon the intellect of youth. They indicate a grievous lack of capacity to comprehend the fragility of a structure which is incapable of bearing any additional burden, when the struggle to support life alone is great, and conservative action is urgently needed to sustain the workmanship. Some restraint ought to be placed on the hazardous attempts of parents to force their children in the prosecution of intellectual pursuits, when the mind betrays any symptom of fatigue or weariness. The common fault to be laid at the threshold of most ambitious people is, that they take it for granted that all their children have equal natural endowments, and that what the one acquires readily, the other can equally well accomplish. No greater delusion can take possession of the understanding, and parents should be warned not to steer

* *Hermann's Human Physiology*, by Arthur Gamgee, M.D., F.R.S., 1875, p. 324.

in a direction whence they may drift blindly into peril and danger. If they calmly consider the advice not to expose all their children to the same ordeal, they will avoid the current which is carrying them only to the ocean of sorrow. One child is born with prodigious capabilities, and the acquirement of knowledge comes as easy to him as the digestion of the daily meal which is provided for his bodily support. Mathematical problems are solved with incredible quickness, and geometrical principles are mastered in such a surprising manner that the knowledge seems almost intuitive.*

Another child of the same parents, who is equally anxious and persevering, may not have the same aptitude ; he may have a feeble mind, and no amount of culture and drudgery can ever place him in the front rank of scholars, or enable him to acquire more than commonplace facts. Books are not the delight of his eyes ; the bent of his inclination is not in this direction. He sees nothing to grasp at and acquire. His restless struggles to overcome this inherent deficiency of mental endowment impair the brain already weak, and too often end in miserable failure

* A case is mentioned by Dr. Carpenter, of extraordinary mathematical ability in a boy, the son of an American peasant, who had received very little instruction in either reading or arithmetic, and yet he surprised every one by solving the most difficult arithmetical questions that were proposed to him, with ease and accuracy, at the age of six years. The immortal author of the 'Messiah,' at nine years of age, composed the church service for voices and instruments, and at fourteen far excelled many of the most eminent musicians of his time.

and disappointment. We may awaken the child's interest and understanding in the work he is set to accomplish, and render abstruse points clear by familiar illustration, but unless his natural powers are considerable, no plan of instruction can ever make him a great scholar.

The power of memory depends greatly on sound physical health ; but also on original difference of constitution, which ought to be taken into account, some children being much more remarkable for the faculty of acquirement than others. This does not appear to be invariably connected with superiority of intellectual endowments, for the facts thus readily acquired are not seldom rapidly forgotten ; the memory is local, so to speak, and is not accompanied by a full perception of the facts, as where the attention is complete, and the mind grasps the whole subject, and conceives it fully from every point of view. If close attention and pondering over a subject enable a child to master it in a given space of time, a habit of quick appreciation may be acquired, but the result is not usually so fixed or permanent, as where information is obtained in a more deliberate manner, and by slow and careful preparation. In reading or studying a book there are certain passages which strike the memory, and arrest it more deeply than others, which take a less abiding form in the recollection ; again, there are other portions which lull the mind into a listless and inactive condition, from which it cannot be

roused to engage the feelings, or awaken an interest. This is of deep importance in the training of children ; for that study which comes easy and pleasant to them is the least exhausting and wearisome. A child will become tired over an uninteresting book, whilst one which amuses and pleases him is easily understood and the facts are remembered. One thought suggests another of kindred nature, and the attention being aroused by a pleasurable excitement, there is much less effort required to master the subject. Some persons are gifted with reflecting minds, and they have the habit of intense attention and correct association. They may be taciturn in society, and be considered stupid and dull ; but they carry away a knowledge of all they see and hear, and can reproduce much of the discussion, if it happens to be worth remembering. "The mental power which, in some cases, is acquired by constant and intense exercise, is indeed astonishing. Bloomfield, the poet, relates of himself that nearly one half of his poem, 'The Farmer's Boy,' was composed, revised, and corrected, without writing a word of it, whilst he was at work with other shoemakers in a garret."* This was acquired by the power of keeping the subject, which was not a wide one, continually before his mind. When any subject of inquiry is extensive and complex, it requires logical proof to enunciate the facts, and involves protracted and

* *On the Intellectual Powers*, by J. Abercrombie, M.D., 1871, 19th Edition, p. 99.

laborious study. If the subject also demands great exactitude and precision, the intellect is much more taxed by this nicety of detail, than by a more simple generalization.

Intellectual strain and even hours of labour are to be carefully measured out according to the capacity of a child. So profound is my conviction of the danger incident on indiscriminate taxation of the mental powers, and that even children with high intellectual endowments have had their general health damaged by this forcing process, that, notwithstanding that they have in after life greatly distinguished themselves in scholastic attainments, I am convinced that a premature decay of the mental powers has been invited, and decrepitude established years before such a calamity would have befallen them in the ordinary course of nature.* What greater error could possibly be conceived than to enforce close attention and drudgery over lessons when the brain feels a sense of weariness, and the bodily strength is weak? The application is imperfect, and attention cannot be given for any length of time, because the vigour of the brain is failing, and the intellectual functions are being spoiled.

* "The forcing system has been by many given up ; and precocity is discouraged. People are beginning to see that the first requisite for success in life is to be a good animal. The best brain is found of little service if there be not enough vital energy to work it ; and hence to obtain the one by sacrificing the source of the other is now considered a folly—a folly which the eventual failure of juvenile prodigies constantly illustrates."—*Education, Intellectual, Moral, and Physical*, by Herbert Spencer, p. 60.

It is considered certain by some pathologists that the brain of childhood may become hypertrophied, but from what causes we are not in a position to speak with any degree of certainty ; beyond this, that it has generally been observed in those cases of bright children, who have given evidence of intellectual precocity ; and this being so, it is obvious that the undue employment of the brain (especially if the general health is in any way defective) may lead to inflammation of the membranes, or at least to severe congestion, or serous effusion into the ventricles.* The anatomical changes after death are extreme elasticity and compressibility, so that the brain is too large for the cavity which contains it ; the upper portion of the skull rises immediately, and the dura mater bulges out at the sides from the expansion beneath, as soon as the bone is separated from the rest of the cranium. The brain is said to be hard and pallid, owing to pressure having obliterated the blood vessels. On making a horizontal section, the grey matter is not seen altered, and the naked-eye view displays an increase in the amount of white matter ; this, according to Rokitansky, is owing, not

* "There can be no doubt that many a child has been sacrificed in early life to the pride of parents, who, delighted with the intellectual activity of their children, have striven to make them prodigies of learning. But in these cases of early and undue employment of the brain, inflammation of the hemispherical ganglion, or of the lining membrane of the ventricles with serous effusion, has usually been the cause of either a fatal issue or of subsequent mental imbecility."—Solly, *On the Brain*, 2nd Edition, 1847, p. 662.

to an augmentation in the number of nerve tubes, or their dimensions, but to the excessive development of the intervening and nucleated substance or neuroglia.”* Wilks and Moxon, after stating that they have no special experience of this condition, say that in the cases that have lately occurred, the hypertrophy was unaccompanied by effusion into the ventricles, which were small, and that the actual growth of the cerebral structure “was found to be due to increase of the neurilemma, or cement between the fibres.”† In adult life, as we have previously seen,‡ when the ossification of the cranial bones is complete, the cerebral contents are not liable to the same degree of variation as in children. From the evidence which has been obtained by scientific research, it seems conclusively established that this disease is most likely to attack delicate and active-minded children, just as atrophy of the brain is sometimes witnessed in young subjects, when they have been struck down by chronic and exhausting illness. It would appear, then, that this and some other morbid conditions of the brain may attack children of fragile frame and intellectual energy—those in whom the senses are acute, and the imagination is lively; whose constitutional debility is apparent in the smallness of the chest, and the large size of the joints; and the waste of whose nervous

* *Jones and Sieveking's Pathological Anatomy*, by Payne, 2nd Edition, 1875, p. 272.

† *Pathological Anatomy*, 2nd Edition, 1875, p. 218.

‡ See Chapter I., on the Headache of Cerebral Anæmia.

tissue, from over anxiety or mental excitement, is out of all proportion to the means of restoring it.

A great desire for learning in young children, physically weak and delicate, is oftentimes disastrous. When the health is robust, the brain tolerates sustained attention with impunity, particularly if the exercise goes on unconsciously (as in the pursuit of pleasure), for then the brain escapes fatigue, which is the accompaniment of effort. The mental development of an individual is inseparably united with the growth of the physical frame, and the two should be looked at side by side in all their relationships. It is an essential property of the brain to feel every debilitating influence, however slight. Impressions made upon the brain by over-exertion when the body, as a whole, is in a state of debility and exhaustion, invite a degree of excitement or stimulation which proportionately distresses and weakens it. In consequence of the presence of irritation in distant and overtaxed organs, the brain is affected, and its functions are suspended or excited according to the amount of mischief which determines the irritability. "Continued activity of a nerve diminishes its irritability in proportion to the time, and may destroy it altogether (exhaustion). In the former case rest restores the nerve to its original condition. The alterations which take place in nerves during exhaustion have not yet been made out" (Hermann). The separate functions of life cannot long be main-

tained in health, under any degree of excitement, without exhaustion being sooner or later felt in the entire organism. Every disturbance, from the most accidental cause, is quickly responded to, and in consequence of the influence of sympathy the affections of each are felt, till disease is complicated or incurable through the bond of connection between the vascular and the nervous systems.

Parents may take comfort from the fact that a popular tradition is held as sound by many people, that the boy who may appear somewhat heavy and backward at first, may turn out a distinguished man at last. This tradition is not a mere fancy or superstition, but is founded on the everyday experience of people who have seen the facts for themselves, and who are not simply bent on propounding a theory. Parents may equally take warning from the fact, that mental strain encouraged to excess in delicate children is almost certain to entail disastrous consequences. If such children are unduly pressed by the vanity of parents, or the mistaken views of teachers, the extreme point of tension is not generally discovered till it is exceeded, and the result of early forcing is too often to produce a state of brain which, at its best, never afterwards rises above the level of mediocrity.

According to Professor Laycock, precocious children are usually of the strumous type, which he terms an approach to a "lower ethnic form," and which

is more or less incompatible with high intellectual development; hence the common phrase, that "some children are too clever to live."

The question will be asked by parents, and those engaged in education—When may we put pressure on with safety? The age of the child is not a criterion, and I can conceive of no greater error than to attempt the adoption of any general rule which shall be applicable to all cases, for children differ widely from each other in a hundred ways, and what will prove a healthy stimulus to some will exhaust and overthrow others. If a child has had his intellect carefully and slowly unfolded, he will be in a very different position at six or seven years of age to one whose culture has been neglected up to that time: the memory may be exercised with safety, and the gift of imitation so strong in childhood made use of from a very tender age. The mind, like the body, is amenable to rational management, and when this is gradual, and not premature or forced, the facility of acquirement will be all the more ready. The process of additional pressure must be conducted with a full appreciation of what the child can accomplish with pleasure, and must not cause weariness. This appears to be about the only rule we are justified in suggesting, and we must discriminate between the strong vigorous child who can bear the pressure, and the weak excitable child who is probably of the two the more willing and anxious to learn. Looking

at the physical health of a child, as a means of judging of its mental strength, I think the commencement of the second dentition is the earliest period when instruction requiring brain-work can be safely pushed. Even then the knowledge should be of a kind which accords with the evolution of the different faculties, or the mind will become disgusted with the difficulties placed before it, and not having mastered simple subjects, it will be unfit to receive more complex ones; hence precise methods of instruction, and exact definitions, if attempted too soon, will be fraught with evil, and the child will languish under the accumulation of facts with which its mind is weighted.

Let us, then, consider the question of dentition in its relation to the physical and mental growth of childhood. The eruption of the first set of teeth is determined by the state of the nervous system, the quality of the food that is supplied, and the surrounding conditions of pure air and water; it is much more delayed in some children than in others, and notably in those who are weakly and delicate, or whose development is retarded by a rickety constitution. When it does commence the nervous system is disturbed, and convulsive affections not unfrequently ensue. Now, if convulsions happen from time to time the nerve centres are rendered still more excitable, and the brain is weakened, which weakness may show itself at the time of the second dentition.

The period of the second dentition, which begins about the seventh or eighth year, must be reckoned, from this point of view, the most important period of childhood—the period when educational training should be cautiously proceeded with, because then the physical growth is very active, and the animal functions are proceeding with extraordinary rapidity, and a large amount of rest and sleep are required for the building up of the tissues. This period in some children is of much longer duration than in others, lasting in weakly, rickety subjects till thirteen or fourteen. The rule of the Factory Laws does not allow a child to work before the age of nine, and at thirteen only nine hours a day, the gradual development of the teeth being taken as the best standard of physical capability, and a more reliable test of age than height, because it is very well known that the tallest children are generally the most weak and fragile.* During childhood the digestive organs are very active, and derangements which are brought about by perverted nutrition are especially common. If disorders of the digestive organs become chronic, any trifling cold may provoke an inflammatory attack, and hence tuberculous diseases are frequent, a latent strumous diathesis being called into activity. Any immoderate intellectual training at a time when the digestive organs are enfeebled, and the appetite is poor, may so impoverish the quality of the blood as to increase the

* Carpenter's *Human Physiology*, 8th Edition, p. 1105.

irritability of the nervous centres. Two instances of this kind have come under my own observation, where delicacy of the general health, with ordinary mental exertion, was followed by tubercular disease of the brain in young, bright, clever lads, aged respectively eight and eleven years. In neither instance could any blame be attached to the mental training; but the physical health in both cases had not reached that standard of strength, or perhaps could not reach it, which admitted of any tension or concentrated employment of the faculties.

Some children are naturally quick and active-minded, and they will make active progress in their studies, and achieve with ease what is unattainable by others; or, at least, if accomplished, it is at great expense, and at the possible risk of a complete breakdown. It is undesirable to make a great demand upon the intellectual powers till the completion of growth, when other demands upon the system are distinctly lessened; all the functions of life cannot bear severe strain at the same time, and therefore advantage should be taken of the intervals of bodily growth to develop the growth of the mind. How frequently does it happen that a long and trying illness has kept a boy from school, and he has lost so much time that it seems impossible that he can make it up again; yet, on recovery, the period of inactivity has had a most salutary effect, and he is not long in coming up to the level of his competitors and rivals.

I have adopted the following classification of headaches :—

- (1) Cerebral headache, attributable to injury, or to acute or chronic inflammation.
- (2) Sympathetic headache, from intestinal and hepatic derangement, known as bilious headache.
- (3) Congestive headache, including *febrile headache, from hyperæmia or active congestion.*
- (4) Headache from anæmia, neuralgia, etc., constituting *nervous headache.*
- (5) Headache depending on some intricate change in the cerebral membranes or tissues of the brain.*
- (6) Organic headache.

(1) *Cerebral headache* seems to me an appropriate term for a variety of headache which has supervened on a blow or injury to the head. The slight concussion so induced has interrupted the functions of the brain, and disturbed the circulation. No notice is taken at the time of the accident, although there may have been disturbance of sensation or voluntary motion, giddiness, and even nausea ; but, these symptoms passing off quickly, neither the patient (if old enough to reflect on the cause) nor the friends have any notion that so slight an injury could be associated with the oppressive headache which ensues. The circumstances under which the brain usually reveals its weakness are the exercise of the intellect, chronic illness, deficient food, and imperfect ventilation. The

* Irritable brain is considered in the next chapter.

brain cannot tolerate any ordinary strain without becoming exhausted, and the intellect is so enfeebled that in many cases all attempts at education have to be given up. The headache is almost invariably frontal. In some cases the pain is also occipital, but I have seldom observed it exclusively in this situation, and when it has been severe, the pain in the forehead has been less intense and overpowering. Scarcely any degree of pain in the back of the head, according to my experience, produces such vital prostration and loss of energy as a less degree of suffering will occasion in the frontal region. The patient has a dull and languid look ; there is no animation in the expression ; the eyes are sunken in the orbits, and move sluggishly ; the lower eyelids are dark, and the face is pallid and drawn ; the skin is cool, and the extremities cold or chilly, because there is a disinclination to exertion ; the pulse is soft and slow, and the bowels are disposed to constipation. The psychological symptoms are an alteration in ordinary manner and character, so much so that the friends tell us he is not like the same child. He takes no interest in anything, and lies about in one corner of the room, as though depressed or unhappy ; he will dose in the day-time and sleep soundly at night. Petulance and irritability are not features of this condition, the nerve centres not being so much involved (at least primarily) as the vascular system, which being overloaded, the want of con-

tractility in the vessels favours congestion and serous exudation into the brain structure itself. Cases with a history of this character cannot receive too much attention, and the prognosis should always be careful and guarded. Trifling excitement may set up inflammatory action, or renew the congestion, which it is so necessary to remove before the brain has sustained irreparable injury. For this congestion, becoming localized, may lay the foundation of a tumour or morbid growth, and our attention in after years is not directed to the injury till continuous or paroxysmal pain in the head, loss of power in the limbs, defective vision, or obstinate vomiting, indicates the presence of serious mischief in the brain. If the case goes on, the general weakness increases, and the child is laid up, giving every one the idea, by his looks and manner, that he is labouring under disease of the brain. Any indiscretion in diet causes flushing of the face, accelerated pulse, and often vomiting. Not unfrequently the symptoms increase in severity, and meningitis ensues ; there is rigidity of the arms and legs, the head is thrown back against the spine, the thumbs are hidden in the palms of the hands by the flexor tendons, the cheeks are flushed, the temperature rises, and the bladder is paralyzed. Now the respiration becomes sighing or irregular, the bowels act involuntarily, the child cannot be roused to swallow anything, and convulsion or coma usher in death. After death, in such cases as these,

there may be presented on a post-mortem examination the evidences of extreme congestion in the veins, ramifying over the dura mater, and in the sinuses and base of the brain; the lateral ventricles may contain serous fluid in excess, and when the brain is sliced, the puncta vasculosa are everywhere turgid with blood, which oozes out gradually from their open mouths after section. It is important not to ascribe too hastily to inflammatory action what in reality may be due to excessive congestion. When the symptoms of meningitis are well marked in young children, they may generally be assigned to tubercle. If there is much elevation of temperature, and fever can be excluded, we need have no hesitation on the subject. But a more slow and insidious form of meningitis may arise. In these cases the temperature is normal or nearly so, the pulse is habitually slow, but rises rapidly on any excitement or after food; the limbs waste and become powerless, the child is irritable and fretful; he sleeps badly at night, and is so restless that the clothes cannot be kept over him. These are the most favourable cases. The injury has been so slight as to provoke into action a slumbering strumous diathesis, or a delicacy of constitution, which but for the accident might never have been developed, or certainly not till a later period, when the intellect has been subjected to extra exertion, or the child has been struck down by an eruptive fever or exhausting diarrhœa.

The *treatment* consists in subduing any congestive or inflammatory symptoms that arise, by careful diet and the observance of strict hygienic rules, the avoidance of all excitement, and everything that tends to disturb the equanimity of the mind; for children become quickly alive to surrounding circumstances, and mentally appreciative of all that goes on around them. In some cases that have fallen under my notice, counter-irritation at the back of the neck has answered well, especially if there has been pain in the occiput, and the muscles are stiff. If the child is not old enough to complain, he will often raise his hand to the back of his head to indicate the seat of mischief. I saw a male child in November, 1876, fourteen months old, who had cut most of his teeth with comparative ease, except with one slight convulsion. About three months before I saw him, he struck his head; and although no bad consequences ensued till the present illness, when I saw him in consultation with the ordinary medical attendant of the family, I have no doubt of the accident having laid the foundation of the congestion and meningitis, which carried him off after four days, from gradual unconsciousness passing into deep coma.

(2) *Sympathetic Headache* (bilious headache).—This is not uncommon in children, from errors in diet, and overfeeding; but it is less frequent with them than with adults, who are more prone to irregularity in eating and drinking. It is to be understood, how-

ever, that gastric disorder, or sympathetic dyspepsia, is often met with from irritation elsewhere ; for instance, it may be the result of ascarides in the rectum, or worms in the bowels ; but we must not forget that the real cause of the disturbance may be inflammation of the brain or its membranes in children. Irritability, peevishness, languor, may give rise to reflex irritation, as we have seen in the previous chapter. Where the brain is affected, vomiting is a constant symptom ; and in those who die, the mucous membrane of the stomach is found digested, or dissolved by the gastric juice,—a proof that the irritation of the brain excites, at least in many cases, untimely secretion of gastric acid.* Andral has pointed out that these patients often throw up a large quantity of greenish bile with painful efforts. In addition to pain and tenderness at the epigastrium, there is in most cases severe pain in the head. This disease also occurs in children from tubercular disease of the lungs, and it is not uncommon during the first dentition, at the time of weaning, if they have been reduced by the eruptive fevers, or by improper food and impure air. They are thirsty and fretful, the vomited matters are sour, the bowels loose, and the motions greenish. Exhaustion may set in with coldness of the surface, and death. In infants the gums should be lanced, and a diet of milk given, or a wet nurse procured, as the case may be ; and

* *On the Stomach*, by George Budd, M.D., F.R.S., 1855, p. 193.

bismuth, magnesia, logwood, and krameria given with aromatic spirits of ammonia, hydrocyanic acid, morphine, etc. It is most common in children who are reduced by previous illness, and who are fragile and excitable. In many cases of this sympathetic disorder there is no remedy that will give relief till the irritation of the blood and brain subsides. The stomach secretes unhealthy mucus, which causes fermentation in the starchy principles of the food, and lactic acid is formed, which disturbs both stomach and bowels. The gases generated by the stomach where flatulence exists are carbonic acid, nitrogen, and sulphuretted hydrogen: and there is nearly always headache in these cases.

These headaches in children are constantly due to the choice of food and drink, and to preserve health and strength it is obvious that the supply should be in suitable proportions, according to age, sex, and occupation. "Thus we may estimate that a child of eight or nine years of age, as contrasted with a full-grown adult, actually gives off, relatively to the weight of its body, one and a half times as much carbonic acid; and the same rule probably applies to its urea."* It stores up in its body a larger portion of the constituents of its food, and a smaller quantity of effete matter is dismissed from its body by the various emunctory functions; and it consequently becomes apparent why the food in the case of children

* *On Food and its Digestion*, by W. Brinton, M.D., 1861, p. 426.

should be purer and easier of assimilation than in adults, whose powers of assimilation are so much stronger, and are capable of chemically converting into the textures of the body ingredients which the feeble power of digestion in young children is incapable of transforming. "The morphological and chemical changes, for example, which transform the cartilaginous femur of the infant into the bone bearing the same name in the adult, imply such large and incessant demands on the part of its organism for lime, magnesia, and phosphoric acid, as may well suggest the possible magnitude of the contrast in the proportions of these inorganic substances required to be present in its food. Nor does the circumstance that such a contrast is probably only quantitative, much affect the deducible result."*

(3) *Congestive Headache*.—The headache that accompanies epilepsy is deserving of some consideration; and to those who are the unfortunate subjects of epilepsy, it will be found a frequent and distressing symptom. Drowsiness, lethargy, heavy sleep, disturbed dreams, and want of animation are premonitory symptoms of an attack, so frequent as not to be disregarded. But headache is more commonly a consequence of the attack, and as such it chiefly concerns us at present. Of fifty-six cases recorded by Sir E. Sieveking in which headache occurred, it was constant or frequent in twenty-eight cases; it

* *On Food and its Digestion*, p. 427.

occurred before the fits in four cases only, after the fits in twenty-two cases, and both immediately before and after the seizure in three cases.* These headaches are of a congestive character, and they present a different class of symptoms in some cases to what they do in others. If the epileptic is of the sanguine temperament, and of full habit, the headache is accompanied by heat of surface, throbbing of the temporal vessels, and fulness of the veins about the scalp; the face is sometimes flushed and the eyes suffused, the patient cannot bear the approach of light, and if he sleeps, he wanders and is disturbed and restless. This condition, in fact, is an acute form of congestion or hyperæmia of the vessels, such as we get in the headache which attends the early periods of some acute diseases, as pneumonia, whooping-cough, and that which I shall next describe as *febrile headache*. In other cases, again, the congestive headache is more passive. It is better described as passive hyperæmia, on which we have dwelt in an earlier chapter. The effect of the epileptic paroxysm is to disturb the equilibrium of the circulation, and to induce relaxation in the vessels, while a tardiness of the circulation springing from the central organ of life—the heart—favours a blood stasis in the sinuses and vessels of the brain. That epilepsy should induce severe headaches when the attacks are frequent is just what we might reasonably anticipate, seeing that the effect of repeated

* *On Epilepsy*, 2nd Edition, p. 59.

paroxysms is to damage the nervous substance of the brain, to impair the memory, and to lead in some instances to idiocy, or even dementia.

I have met with most agonizing cases of headache in children the subjects of mitral regurgitation or insufficiency. In one case, which was under my care at intervals for upwards of three years, the suffering was acute and unremitting; the poor girl presented the appearance of a much older person, the cheeks had a dusky crimson flush on them, and the brain was habitually overloaded with venous blood. The superficial veins of the neck and scalp were distended, and the temporal arteries throbbed violently, for the occasional epistaxis, which had brought relief from time to time, had long since ceased to recur. Active purgation, by means of a grain or two of calomel at night, and a febrifuge and saline aperient in the morning, failed on some occasions to give relief, and I was compelled to leech the temples, which for a time lessened the tumultuous action of the heart, and alleviated the headache.

Dr. Hare makes some interesting practical remarks on the treatment of *Congestive Headache* by leeching. A girl, fourteen years of age, in November, 1882, who had over-exerted herself at school, suffered from "extremely severe, oppressive, dull, heavy pain, occupying the whole head, but especially severe over the brows, and along a line corresponding with the base of the brain." Rest in bed, salines and aperients,

and evaporating lotions to the head were prescribed, but the pain continued without the slightest intermission. A few days later four leeches to one of the temples were applied, and, although only two took, slight relief was obtained. A week later four leeches were applied to the other temple; these bled freely, and the vertex headache departed, but the pain along the base of the brain continued without a day's intermission. During the ensuing thirteen weeks she was kept away from school and head-work. Bromide of potassium, and subsequently bromide of ammonium were ordered, and the steeping of hands and feet in hot mustard and water, besides other forms of counter-irritation. The heavy headache remained absolutely persistent in spite of this treatment. Five leeches were again applied to one of the temples, and later on the same number was repeated. The first relieved the coronal pain, the second removed it entirely. The girl returned to school, and at the end of six months had not been absent from her duties.*

Treatment.—This must be regulated according to the strength and constitution of the patient. If the child is of a nervous disposition, the surface pale, and the circulation languid, small doses of strychnia with a mild preparation of iron will be useful, by increasing the tone of the system generally, and a stimulating liniment at the back of the neck will relieve the

* 'On Good Remedies out of Fashion,' *British Medical Journal*, vol. ii. 1883, p. 151.

headache. The extremities should be kept warm, and moderate exercise encouraged. Sponging the body with Tidman's sea salt will be beneficial ; it improves the force and character of the capillary circulation, and in some degree removes the liability to headache and cerebral congestion. In the case of stronger children, a calomel purge, followed by a saline aperient in the early morning, will be necessary, if the bowels are disordered, or worms are suspected. Sulphate of zinc, in a bitter infusion, is a remedy worth trying in some cases ; it improves the appetite, and imparts a degree of vigour to the digestive functions which relieves the oppressive headache. If, however, the headache is continuous and acute, bromide of potassium alone, or combined with bark, ammonia, or valerian, will be advisable till its severity is mitigated ; and when the pulse is quick and unsteady, or anæmia is present, digitalis with iron may have a beneficial effect, by reducing the venous fulness and promoting the force of the arterial current.

Febrile Headache.—I speak of this variety of headache because the brain is active and susceptible in young persons, and the circulation being additionally excited by the fever process, the vessels convey a larger quantity of blood to the brain than they do in health. If the subjects of fever are robust and strong, the hyperæmia of the vessels is all the greater. In typhus fever the headache is frequently most intense—dull and heavy across the forehead and in

both temporal regions. Sometimes the pain extends over the whole head, and is not confined to the vertex or occiput ; nor is it so throbbing, darting, or bursting as in relapsing fever or the headache of some other febrile disorders. In the typhoid fever of children there is usually dull frontal headache, and the mental faculties are disturbed ; sometimes delirium or convulsions ensue, but more frequently there is a moderate degree of headache during convalescence, if the patients have exerted themselves too much, or have been awake too long, or without food. In all acute diseases we should be on the look-out for headache, as it is of common occurrence in pneumonia, bronchitis, whooping-cough, and the various exanthemata. I have observed it extremely severe in scarlet fever and measles, particularly before the eruptive stage is fully developed.

In the *treatment* of headaches complicating these febrile affections, a few leeches to the head, cold affusion, or the ice-cap, will sometimes be advisable to control the vascular excitement within the head, and to reduce the activity of the cerebral circulation ; whilst the specific diseases on which they depend must receive proper attention.

(4) *The Headache of Anæmia, Neuralgia*, etc., may be classified as *nervous headache*, and the description given in the first and sixth chapters will be found to include all that is important under this variety in children. *Neuralgic headache* usually afflicts those

of a timid and delicate constitution, and if they have been reduced by acute or chronic disease, it is readily excited in them. I have met with it in boys and girls whose intellects have been overtaxed by study, and by too long and wearisome lessons. It is also induced by indoor confinement and bad air, though it is not so common from these causes as the congestive form of headache, in which the vessels are over-distended. Dr. West says, "It does not by any means depend on over-study, though I do not ever remember meeting with it in children who have not yet gone into the schoolroom ; and I have frequently found it dependent on too continuous application, though the number of hours devoted to study in the course of the day may not have been by any means excessive."* From my own experience I have certainly observed it quite as often among children whose intellect has not been overtried, or even exerted at all ; and I am inclined to the view that any depressing causes, or unhealthy surroundings, are capable of exciting it into action. I have seen a bad attack in a boy, fifteen years of age, whose nervous system was reduced by a long and trying local disorder. Neuralgia of the ophthalmic and temporal branches of the fifth nerve (succeeding lymphatic obstruction and painful muscular spasms in one lower limb), was experienced on several occasions. He was often kept

* *On some Disorders of the Nervous System in Childhood* (Lumleian Lectures, 1871), p. 15.

awake at night, and had become so nervous, that sleep could not be obtained till he took some brandy and water, and the attack was only removed by a generous diet, and full doses of quinine three times a day. Whenever at his best time he took a longer walk than he was able to accomplish with comfort, he was liable to headache. I have known fearful neuralgia to come on in delicate girls from twelve to fourteen, who are approaching the catamenial period, but in whom it has not appeared, particularly if the intellect has been strained, and the temperament is over-anxious.* These patients are more frequently seen in the out-patient department of our hospitals than in private practice, for poor living is a great predisposing cause. They are pale and anæmic, and some of them have been thrust into situations of hard work, which they have not the strength to fill; and if there is cough and loss of appetite, a consumptive tendency can be frequently detected.

The headache caused by dental irritation has been attributed to disturbance in the functions of the superior cervical ganglion, from which the carotid artery, and its branches, derive their vaso-motor nerves.

A case of supraorbital neuralgia is recorded by Mr. Nunn in a young lady about eleven years of age, which yielded to lancing of the second molar tooth.†

* Excessive mental effort is very prone to delay menstruation.

† See a paper 'On Irritation of the Dental Nerve,' *British Medical Journal*, May 5, 1877.

A similar case also came under my own notice in a girl of ten, who had suffered very severe headache for many weeks. The first molar tooth on the left side was extracted; and from that time the patient began to recover. Headache from dental caries is more rare in children than in adults.

In one case that came under my care in October, 1876, pleurodynia was added to the acute supra-orbital and temporal pain, and there was a fearful degree of apprehension and nervousness. This assemblage of symptoms was mainly brought about by the ordinary causes which induce anæmia. In the case of a little girl, eight years of age, who first came under my care in November, 1876, with cardiac spasm (angina pectoris), there was pallor of the face, weak pulse, and headache of a neuralgic character supervening. If the second dentition is delayed, and the teeth are slow in appearing, neuralgic headache, involving the branches of the fifth nerve as they ramify over the brow and temple, is oftentimes very acute in boys and girls. The symptoms which denote neuralgic headache are localized pain in one temple, or half of the forehead, coming on in paroxysms; very frequently it is situated over the brow, or supra-orbital ridge, and the ball of the eye is tender. The pain seldom extends across the forehead, but remains limited to one side of the head, and either passes superficially beneath the muscles of the scalp to the occiput, or in stabbing paroxysms through the eye

itself, in the same direction. Vomiting is not a frequent symptom, nor yet the disposition to refuse food ; but when the attack is severe, and one eye is much affected, there will be nausea and sickness, tears will course down the cheek, and light and sound will increase the suffering. Sometimes this is so violent that the patient has fainted away, and the timidity of the child's nature has been so nurtured by it, that it could not sleep alone, or be left in the room at night without a candle. Sometimes the pain will come on in the morning, and depart after a good meal, or it will occur in the evening when the child is exhausted, and ought to be in bed. The pulse is usually small, excitable, and quick, or even intermittent, and the emotions are so sensitive, that the child will cry at the expression of any word that savours of the least harshness. When the pain is of such continuance as to reduce the child's health, the intestinal secretions are disordered, and the urinary secretion is excessive, or it abounds in urates. The whole expression is one of languor and exhaustion, and the child is incapable of any mental exertion. In the intervals of pain there may be a full display of cheerfulness, and the stupor and indifference which betoken organic disease of the brain are absent. The attacks are not of long continuance, and they pass away entirely, leaving the patient quite cheerful ; but they return again in a week or fortnight.

I do not think we ought to make a mistake in

diagnosis, though in some cases it is perplexing, where the symptoms are not so marked as I have described, and especially in young children about the period of their first dentition. Nervous affections and general increase of sensibility are common enough in young children about this time, or in older children after a long and exhausting illness, as chronic diarrhœa or typhoid fever. We should be careful to ascertain whether the pain in the head is continuous and unremitting before we commit ourselves to an opinion, or carry out any plan of treatment. Having made out our diagnosis, and satisfied ourselves that the cerebral membranes are not implicated, we do not become anxious about a neuralgic seizure, for though it robs life of much enjoyment, it does not tend to shorten it, and in these cases it passes off as the health improves. Severe pain, local and either continuous or recurrent, if attended with nausea, vomiting, or constipation, ought to put us on our guard against meningitis or cerebral tubercle; nor should these symptoms delude us if they pass off, for they may, notwithstanding, be due to lurking organic mischief, and have a fatal termination at no distant period. Many years ago I met with an instance of headache, chiefly frontal, in a girl, fourteen years of age, which had continued on and off for months, without causing any anxiety to the parents. When the head was very painful, the child was kept from school, and when the suffering passed away, school-work was resumed, the

health of the child being at all times delicate. After the headache had troubled her more or less for a year, inflammation of the meninges, accompanied by convulsions, set in, and the child lost her life. There were no gastric symptoms present to attract attention to the stomach, and the headache, undoubtedly due to cerebral exhaustion in the first instance, was followed by inflammatory action which could not be traced to tubercle.

Treatment.—This consists in enforcing rest, if educational zeal has been carried too far, and getting the general health amended in every possible way, that the nervous system may be improved, and degenerative changes prevented. Quinine, cod-liver oil, fresh air, and absolute rest of mind and body, are important at this early period of life. For the medical treatment, the plan to be adopted is much the same as that recommended in the chapter on neuralgic headache in adults, and the formulæ in doses suitable to the age of the child will be equally appropriate.* Dialysed iron, either in the character of syrup, or combined with glycerine, is an excellent preparation where it is sought to improve the quality of the blood, and to remove the anæmia (Form. 24a). As it is almost tasteless, no child will refuse to take it, and unlike many other preparations of iron, it is readily absorbed, causing neither indigestion nor constipation.

* See Chapter VII., on Neuralgic Headache.

(5) *Headache depending on some intricate Change in the Cerebral Membranes or Tissues of the Brain.*—This condition I have more often observed among hospital out-patients than in private practice. The children are generally from three to eight years of age; they gradually fall into a delicate state of health, and cause anxiety in the minds of their parents. In some cases there is the hereditary tendency to struma and consumption, nervous disease, or syphilis; in other instances, irregular and drunken habits on the part of the father have implanted a liability in his child's constitution to take on nervous disorder. Frontal headache is the first symptom of which any complaint is made; the child is lethargic and indisposed for exertion, the mind strays and wanders from any pursuit or occupation, and the intelligence is dull and totally incapable of strain or concentration. The child's disposition is much changed; if he has been bright and cheerful before the illness overtook him, he is now listless and dull, or he is so excitable, that, if thwarted in his plans or wishes, he becomes exceedingly fretful and quarrelsome. When playing with his companions, he is liable to outbursts of passion, and he goes into such a state of frenzy that he may inflict bodily harm on those about him. After a fit of temper, or looking over a book, the child will suddenly become drowsy, and rest his head on a table or chair, and fall off to sleep. It is the sleep of exhaustion, but quiet and profound; the skin and head are

often perspiring, and when he awakes he is unrefreshed. At night he is restless, tossing off the clothes, and in the morning is fretful and irritable, as though the sleep had done him no good. The pulse is soft and quiet, occasionally intermittent, but there is an absence of cardiac disease ; there is no sickness and no elevation of temperature ; the tongue is clean, and the bowels are regular, or disposed to constipation. In fact, it is not a condition of meningitis, though there is no reason whatever why such cases in pursuing a downward course should not lead to inflammatory mischief in the brain or membranes. Rather, the tendency is to cause an anæmic state of the blood and tissues, and an increase of serum in the lateral ventricles, and beneath the arachnoid, or between the sulci of the convolutions. If this goes on, the head occasionally gets larger at the sides and more prominent at the forehead, and this appears all the more obvious as the child loses flesh and the face shrinks. In rickety children this headache is not uncommon, and recovery is the more slow and tedious. I have observed it among boys who are fond of school and books, particularly if they are of a nervous or sensitive temperament, when they become over-anxious with their studies, and this worry is very prejudicial to the nervous system. If the health is naturally delicate, and the food unwholesome, and boys are deprived of air and exercise, they are the more likely to be victims to this form of suffering. As to the pathology of this

affection, there can be no doubt of its being one of exhaustion, and the cerebral texture is probably more exsanguine and less firm than in health. I think there is nothing incompatible with recovery, if the blood improves in quality, and the brain is better nourished. Pure air, wholesome food, and proper medicines will be required. Whilst the pain lasts, and the excitability of the nervous centres is great, there is no remedy like bromide of potassium, combined with small doses of belladonna, and, in some cases, with iodide of potassium. If bark or quinine is ventured on too soon, the headache returns with its former violence; and the same will happen if iron or strychnine is had recourse to before the brain is strong enough to bear a sudden influx of blood into its vessels.

(6) *Organic Headache in Children* arises from the same set of causes as in adults. Any morbid growths from the bone or membranes, or from the white or grey substance of the brain itself, usually induce severe pain in the head, and such physiological symptoms as serve to indicate with tolerable accuracy the situation of the mischief. Unfortunately, the condition in too many instances defies all treatment from medicine, but sometimes surgical measures may be valuable. Cancerous or fungoid growths may spring from the dura mater, and in extending outwards cause absorption of the bone, and elevation of the tissues of the scalp, resembling an encysted tumour.

When interfered with they cause convulsions and death. These growths rarely implicate the bones, which often present obstruction to their progress, but at times the hardest structures do not oppose the direction which they take. Tumours having this perforating tendency may also grow from the diploe, and even from the cellular tissue beneath the arachnoid and pia mater, and from the cerebral substance itself. It is a curious fact connected with these tumours, that they often attain considerable size before they produce any disturbance in the functions of the brain; and *post-mortem* examination has occasionally revealed their presence in the substance of the brain, when no symptoms to attract attention to the brain have been observed during life. This depends in a great measure on the situation of the tumour, for one which is embedded in the substance of either hemisphere, and does not press on the sinuses, or falx, or tentorium, is less likely to cause pain or uneasiness.*

* A case is related by Andral where an osteo-fibroid tumour was attached to the tentorium, and this caused such pressure on the cerebellum as to diminish its volume, and change its texture into one of extraordinary hardness. The tumour was traced to a fall four years before death, and the leading symptoms were no uneasiness at the time of the accident, but later on a dull pain at the left part of the occipital bone; giddiness from time to time, and occasional loss of consciousness for a few minutes. Later on, the upper extremity of the right side was attacked with a painful tetanic shock. Five or six of these shocks followed each other rapidly, and then intervals of months elapsed; then they became more frequent, limited to the right arm, and paralysis of this limb came on, at first transient, and afterwards more complete. The right lower extremity also lost the power of

Even a cancerous tumour may arise as a primary disease in the brain of a child, and pursue a slow and tedious course, setting up no disturbance, unless by increasing growth or pressure it should involve the membranes and excite inflammation. A case of this kind is related by Mr. Solly, in a child only four years of age.* The chief symptoms were drowsiness and inactivity for some months, followed by an epileptic seizure. Under the use of mercurials and purgatives, the child apparently got well, but after a time he became again sleepy and forgetful; his intellect was impaired, and he died at the end of six months from the time of the epilepsy. After death a tumour was found in the posterior lobe of the left hemisphere, the size of a hen's egg. Neither the membranes nor the substance of the brain were more vascular than usual.

A very rare and important case of *hydatid of the brain* is recorded by Mr. Goodsall. A ballet girl, fourteen years of age, had headache of two or three months' duration, most severe during menstruation. In other respects her health was good. On September 20, 1881, at 9.30 a.m., she had a sudden attack of vomiting, which recurred several times during the day, but she was not ill enough to keep her bed. In the evening she became insensible, and the following morning suddenly expired at 5 a.m. On a *post-mortem*

motion, but there was no convulsive movement.—Solly, *On the Brain*, p. 647.

* Ibid., p. 648.

examination there was found in the left centrum ovale majus, on a level with the corpus callosum, a white opaque oval body, about two inches in length and three-quarters of an inch in breadth. It contained fluid. At its anterior extremity was another cyst, about an inch in length, which had ruptured into the anterior cerebral lobe. There were no cysts found in any other organ of the body. The cysts were regarded by Dr. Lionel Beale as hydatid in their origin, and no hooklets were found. The fluid in the cysts contained quickly growing fungi.*

It is remarkable to what an extent the brain may be injured without producing any symptoms. Tumours and abscesses have been discovered on *post-mortem* examination when no headache has been experienced during life. My friend, Dr. J. E. Clark, of Clifton, has recorded a case of cerebral abscess in a child four years of age, who was kicked by a horse over the right orbit five months previously to his admission into the Bristol Royal Infirmary. The wound discharged freely, and after some weeks healed. On admission, a soft pulsating tumour, the size of a large marble, was observed over the right orbit. Coincident with the closure of the wound, the symptoms of cerebral irritation became very severe. The body was drawn backwards, and the flexors were in a state of permanent spasm. He was perfectly deaf, blind, and insensible, and convulsions were frequent. He was

* *The Lancet*, vol. ii. p. 749.

unable to swallow, and there was scarcely any reflex action. "A grooved needle was passed into the swelling, and after passing it nearly two inches, pus flowed through the groove." The skin was now divided with a scalpel, and as the abscess was laid open the cerebral substance could be seen. "The scalpel was then pushed into the brain, and three ounces of thick pus issued forth. There was no fœtor. A piece of wire drainage tube was placed in the cavity of the abscess." . . . In two hours afterwards the muscular spasm relaxed, and the child asked for bread and butter, which he could bite and swallow. Notwithstanding troublesome hernia of the brain followed and continued for two months, and vision of both eyes was lost, the child was discharged well at the end of ten weeks from the date of admission. Dr. Clark has been kind enough to inform me by letter "that, so far as he could gather, the child was free from headache entirely." *

Tubercular tumours of the brain are far more common in the case of children than the other varieties, and they more frequently involve the substance of the hemispheres and cerebellum than the membranes which are liable to inflammation; in fact, tubercle of the brain is very prone to induce inflammation and effusion into the ventricles. The symptoms are severe headache, continuous or paroxysmal; then passing

* 'Case of Cerebral Abscess in a Child,' *British Medical Journal*, November 29, 1873, p. 632.

off to recur again with convulsions, insensibility, and coma. After death it is not uncommon to meet with flattening of the convolutions, effusion into the ventricles, and a hard portion of yellow tubercle, varying in size from a marble to an egg. As I have previously mentioned,* severe headache with vomiting, constipation, impairment of intellect, convulsive movements, paralysis or coma, disturbance of vision, etc., are the prominent symptoms of headache due to organic change.

The retinae should be invariably examined ophthalmoscopically, if tubercular disease be suspected, for should tubercular retinitis be detected the diagnosis would be irrefutable.

* See Chapter XIII., on Organic Headache.

CHAPTER XVI.

OVER-PRESSURE.

Over-pressure in Elementary Schools—Irritable Brain, its Nature and Causes—Headaches in School Children—Myopia—Hypermetropia—Astigmatism—Half-time System, advocated by Mr. Chadwick, C.B.—Education and Body-growth—School Board Legislation—Weight and Size of the Brain at Different Ages in Both Sexes—Ventilation of Schools—Personal Cleanliness.

Treatment.—Bromides and Rest in the Congestive Stage of Headache—In Neuralgic Cases, Quinine and Cod-liver Oil—In Anæmic Cases, Preparations of Iron.

THE subject of over-pressure in elementary schools has already been alluded to in the previous chapter. It has for some time past attracted a great deal of attention, the fact really being that whilst cases of over-pressure are sometimes met with, they are by no means of such frequent occurrence among healthy children as is generally supposed.

In considering the question in a wide and liberal sense, we must not pick out here and there special cases for criticism and complaint. But requisite proof is forthcoming that a great many children suffer, and

even break down, during the most impressible period of their lives in their effort to follow out the established curriculum of study, and of this fact no doubt can remain in the minds of unprejudiced persons. It is well that it should be here clearly pointed out how very often illness, which is attributed to over-pressure, is due to disease, deficient food, or to improper hygienic surroundings.

I have elsewhere fully entered into this subject, and therefore shall content myself here with only a brief consideration of it.*

All that we see and know of the present system of education in children, among the nervous and delicate, attests a real danger, and one apt to be overlooked in these times of miraculous change. In anxious and underfed children an "irritable brain" is very likely to occur if they are overworked at school; the over-strain produces congestion of the brain, and if this be allowed to go on, and no warning taken of the headache, and the want of energy incidental to it, meningitis may supervene.† An irritable brain is a condition of excessive sensibility, a state of over-activity and excitability, but not necessarily associated with congestion or inflammation, in its earlier stages, when it may be often arrested by appropriate treatment. I am disposed to think that there is a state of cerebral

* 'Headaches in Children in their Relation to Mental Training,' Read at the International Medical Congress at Washington, U.S., 1887.

† 'On Irritable Brain in Children,' Med. Soc., London, 1886.

irritation independently of any organic lesion, although the precise change is involved in some obscurity. The primary change is probably one of anæmia of the brain, where it is badly nourished, as is not infrequent in half-starved children. The nervous system becomes exhausted, and then its equilibrium is destroyed. I pointed out in the paper to which I have referred that no ophthalmoscopic changes were observed in the cases that came under my notice, and that all recovered. Optic neuritis is sometimes absent in simple and tubercular meningitis, and when this is so, it is a favourable sign. Of three cases of tumour of the brain operated on by Mr. Victor Horsley, there was no optic neuritis in two of them, and these recovered. In the third case there was optic neuritis and the patient died.*

During the last five years Professor Bystroff examined 7478 boys and girls in the St. Petersburg schools, and he found headache in 868, or 11·6 per cent. The per-centage of headaches increased almost in direct progression with the age of the children, and the number of hours devoted to mental labour ; thus, whilst headache occurred in only 5 per cent. of the pupils eight years of age, from 28 to 40 per cent. were attacked from fourteen to eighteen. Dr. Bystroff believes, in common with other observers who are interested in the question, that the excessive mental strain enforced by the present educational programme

* *British Medical Journal*, April 23, 1887.

is the essential cause of obstinate headaches in school children. The brain becomes irritable and excited from over-pressure, a view which I have long maintained, and then follow congestion and other disturbances in the cerebral circulation.* Dr. Triechler found habitual headaches in one-third of the pupils at Darmstadt, Paris, and Nuremberg.† Similar experience comes from Denmark, Sweden, and Norway.

From an elaborate report which Sir Crichton Browne drew up upon the subject, it appears that about 46 per cent. of the children attending elementary schools in the poorer districts of London suffer at certain seasons from habitual headaches. All these, however, he did not attribute to over-pressure. These conclusions were confirmed by the result of further investigations in a poor part of London, where he found exactly 47 per cent. of the children attending the classes complained of habitual headaches. In the autumn of 1884 Dr. Maurice Davies made a searching examination of 2180 children attending the Jews Free School at Bell Lane, Spitalfields, and he found that 31 per cent. of them suffer from habitual headaches. In high-schools in Norway, Sweden, Denmark, and Germany, where over-pressure abounds, this percentage of headaches is often exceeded. As many as 12 per cent. of the boys attending certain schools in

* 'Headaches in School Children,' *British Medical Journal*, May 15, 1886.

† *Intellectual Times*, April, 1880.

the country suffer habitually from bleeding at the nose, and as many as 25 per cent. of the children in some elementary schools are short-sighted.*

Here, then, is evidence to show that in some schools habitual headaches are found in a proportion of 31, 46, or 47 per cent., a proportion inconsistent with the ordinary deviations from the healthy standard.

If headache is once established, and the child goes on with school work, symptoms of exhaustion are almost certain to supervene, and the child becomes thin, lacks energy, and eventually breaks down. If ocular defects are present, they should receive attention at once, that the eyes may be exercised with the least possible strain and difficulty. Near-sighted children often suffer from frontal headaches and intolerance of light, the eyes becoming red and aching.

Thus 25 per cent. of school children are said to be myopic, a perfectly reasonable explanation for headaches in 25 per cent. of the children. And if 25 per cent. of school children are myopic, a considerable percentage must also be hypermetropic and astigmatic—which are more fertile causes still for headaches. Again, if 12 per cent. of the children bleed from the nose, it is merely an indication of over-repletion or engorgement of the vascular system, which is *per se* a cause for headache. If to these sources be taken into consideration decayed teeth; indigestion, arising from errors in dietary; the bad ventilation and in-

* The *Times*, April 24, 1885.

sufficient cubic space of the class-rooms of our schools, and the dormitories of the children of the poorer classes, it must be admitted that sufficient proof is afforded for the existence of headaches, quite independent of over-pressure, in a very large percentage of school children, and a careful scrutiny of the reported cases of "over-pressure" shows that very many of them are really not such cases, but cases of disease engendered from the fore-named and kindred causes.

If the air children breathe be impure, and the light of the rooms in which they live or study be defective, these conditions, united with too prolonged exercise of the eyes, conspire, as Dr. Stevens says, to act as immediate causes of myopia.*

Myopia is sometimes caused by the use of books printed in small type. When the type is of the old English pattern, as in the German books, and the letters are small and the lines near together, it invites close attention, and greater strain to the eyes. The Austrian Minister of Public Instruction has recently forbidden the use of such books in the public schools of Austria.†

There is necessity for reform in the abridgment of the working hours, in allowing more time for recreation and gymnastic exercises, more sleep, and all those measures that maintain the general health at the best possible standard.

* *On Functional Nervous Diseases*, 1887, p. 165.

† Editorial, the *Lancet*, December 31, 1887, p. 1338.

This leads me to refer to the "Half-time System" in education advocated by Mr. Chadwick, C.B.,* which means a division of labour so arranged that a limited time shall be devoted to book learning, a limited time to physical work, and a limited time to games and exercises. As long ago as 1833, Mr. Chadwick was appointed one of a Commission to inquire into the condition of the labour of children and young persons employed in factories. He found that these children worked as long as adults—eleven, twelve, and more hours daily. The Commission found that six hours daily was as long as young children could work without sustaining bodily injury, and that if long hours were enforced double sets of children must be employed, each set to work six hours. It was further proposed that every child should be under school instruction three hours daily, and hence the name "half school timers." Thus three hours in school was cut off from that time in the workshop, and the effect of this was a prevention to bodily overwork, better growth, and a better quality of labour. The advantage of the reduction of the teaching hours was shown to be established by the most conclusive evidence in the amount of knowledge gained, and the superiority of mental quickness and activity. There was also an enormous saving in the yearly expenditure.

* *The Health of Nations*, by B. W. Richardson, M.D., F.R.S., 1887, vol. i., p. 170.

The truth has dawned on teachers and intelligent parents that the education of children during all stages of their bodily growth requires to be very carefully conducted. Mr. Chadwick has shown that the power of receiving instruction, and the capacity of attention, grow with the body, and that very young children can only receive lessons of one or two minutes' length ; at seven years of age they can give their attention for fifteen minutes, and by the time they reach fifteen years of age about half-an-hour. If the attention is longer given, it is at the expense of succeeding lessons. It is well known that children are incapable of concentrating their thoughts on one subject long together, and hence it has been found necessary, as far as possible, to shorten the duration of the school hours. Half-an-hour's devotion to study, followed by relaxation, in the shape of games or some other congenial physical exertion, gives the mind strength, and enables the child to resume study with renewed vigour and spirits. The capacity of attention varies with the strength or weakness of the pupils ; the healthiest and strongest have the greatest retentive powers. The time these children are kept together in school bears no relation to the work done, three hours being just as useful as five or six. Sustained effort of thought can only be carried out for a limited portion of the twenty-four hours, and greater things are accomplished by moderate effort, with intervals of relaxation, than by forced effort and

continued thought.* This was the conclusion arrived at by Sir Benjamin Brodie many years ago.†

Sir Crichton Browne has alluded to the connection between "Education and Body-growth." He says that the growth of mind being dependent on the growth of brain, and the growth of brain on the growth of body, it is highly important to determine the laws of education so as to obtain the best body-growth, taking the degree of body-growth as an index of cerebral development.‡

Philosophers of a past generation, both at home and abroad, allude to the importance of conducting the education of children with due attention to their physical growth. That great thinker and essayist, Montaigne, remarks "that those who separate the education of the mind from that of the body, do a great wrong." Many writers refer to sickness, mental derangement, and early death under the pernicious influence of over-teaching. The trial is too severe for those who are not strong and vigorous, and many drop by the way. The saying of Velpeau should never be forgotten: "Once destroy the balance between the mental and physical condition; what you gain in intellect you pay in tubercles."

Education has such an intimate connection with health that they must be viewed together. There is

* *The Physiological Limits of Mental Labour*, Richardson, op. cit. p. 183.

† *Psychological Inquiries*.

‡ *Education and the Nervous System*, 1884.

always going on a re-action between the mind and the body, and physical diseases are largely due to mental influences during the earlier years of life. The mind being kept in a state of tension for a length of time, modifies the organic structures, and renders them susceptible of change when shock is imposed upon them. I could quote instances of serious disease as the result of excessive mental strain, or "mental shock," received by the body through the mind. Thus, fear has invited attacks of chorea and of epilepsy, ending in insanity and death. Dr. Richardson quotes an instance in which a little boy was frightened by a dog, and became the subject of diabetes, and died. The mental impression was so profound that it told on the bodily organization at once, and modified the chemical action going on in the body.*

M. Peter has lately stated that at the École Polytechnique, in Paris, he found that school fatigue frequently induced febrile symptoms, particularly in the summer months during the season of examination and severe competition.† This over-pressure causes excitement, weakens the body, impairs digestion, and finally breaks down the child. In Germany it is the practice to close the schools when the thermometer reaches a certain height.

Our school boards have something to answer for, in the measure they deal out to those parents who

* *The Commonwealth*, 1887, p. 94.

† *Medical Press and Circular*, Dec. 21, 1887, p. 595.

omit sending their children regularly to school when they are not in a fitting state to exert themselves in the prosecution of their studies. There may be much to be said in extenuation of these severe measures, from the ready excuses which the poor offer for keeping their children at home ; but they have sometimes reason on their side, and it is only requisite to take a glance at many of the cases brought before us to see how opposed it is to common sense and reason to expect that such children should be supposed capable of grasping the most simple facts, with health so shaken. I find that sleepless nights, irritability of manner, drowsiness in the daytime, headache, and loss of appetite are the usual train of symptoms, and they are just what we might anticipate when children are imperfectly fed and clothed. In a large number of cases the children are anæmic, the blood is poor and impoverished, and there is a taint of consumption or scrofula, in one form or other. If they are allowed to continue at school they finally break down altogether. This applies in a far greater ratio to girls than to boys. "Beyond doubt, the girls, from the fact that they *are* girls, are more likely to suffer than boys." *

* 'School Hygiene,' by Dr. Frederick Winsor, Winchester, Massachusetts. Quoted from *The Building of a Brain*, p. 72.

The size of the brain may have something to do with this. "The average weight of the human adult male brain is about 3 lbs. It increases from one year old up to twenty. Between twenty and thirty there is a slight decrease on the average ; afterwards it increases, and arrives at its maximum between forty and fifty ; after fifty to old age the brain gradually decreases in weight. Tiedemann, in his paper on

The ventilation of schools and personal cleanliness are of the highest importance to health, and, if not attended to, headaches and failing powers are certain to ensue.

As Dr. Thorne Thorne justly says, when England was more sparsely peopled, there was a more abundant supply of pure air; but now houses are so crowded together, and people in houses, that the air space per head is wonderfully diminished in our cities and large towns. Thus in 1881, out of 25,974,439 inhabitants in England and Wales, 17,636,646 are massed together in town or urban districts, leaving only 8,337,793 in country and rural districts.* The

the brain of the negro, states that the brain of the adult male varies between 3 lbs. 2 oz. and 4 lbs. 6 oz. The brain of men who have distinguished themselves by their talents is often large. The brain of Cuvier weighed 4 lbs. 11 oz. 4 dr. 30 grains troy weight. The brain of an idiot, fifty years of age, weighed only 1 lb. j. 6 oz. 4 dr.; and another, forty years of age, weighed but 1 lb. j. 11 oz. 4 dr. *The female brain usually is lighter than the male.* It varies between 2 lbs. 6 oz. and 3 lbs. 11 oz. Tiedemann never met with a female brain that weighed 4 lbs. The female brain weighs on an average from 4 to 6 oz. less than that of the male, and this difference is already perceptible in the new-born child."—Solly, *On the Brain*, 1847, p. 162.

"The average of both sexes differs, however, in the various races of mankind. Dr. Davis (*Proceedings of the Royal Society*, January 23, 1868) found the mean of the European series to be 46·87 oz.; of the Asiatic series, 44·62 oz.; of the American series, 44·73 oz.; of the African series, 44·3 oz.; and of the Australian series, 41·38 oz. Dr. Thurnam (*Journal of Mental Science*, April, 1866) gives 49 oz. as the average weight of the European brain, whilst in distinguished men it amounts to 54·6 oz."—*Carpenter's Human Physiology*, by Power, 8th Edition, 1876, p. 786.

* 'Cleanliness in Relation to Health,' *Practitioner*, Dec. 1887, p. 463.

purity of the air breathed by children in school-rooms is necessary to their well-being and to keep them in health, for if the emanations thrown off from the skin and lungs be inhaled by the healthy, they become potent agents for mischief.

Treatment.—In the early stage, when the brain is simply irritable, and there is slight headache, disturbed sleep and easily induced fatigue, lessons should be set aside, and such remedies employed as lessen cerebral congestion and invite repose. Over-pressure of the brain is the greatest factor in the production of cerebral congestion.* Bromides are very serviceable to calm the nervous system, and sponging the forehead three or four times a day with cold water will have an excellent effect. During the continuance of these symptoms light nutritious food should be ordered, and care taken not to overload the digestive system. When the headache is of the neuralgic type, quinine and cod-liver oil will be found serviceable; and if there be anæmia, some soluble preparation of iron, freely diluted, and taken after food will greatly aid the cure.

Next to proper food and nourishment comes sleep, and growing children can scarcely have enough. They require all the more when the brain has been hard at work during the day, and it is for this reason that, I think, home lessons are injurious by further exhausting them, more particularly if they sit up

* See the remarks on Ocular Headache, p. 214.

pursuing their studies till midnight. All children need more sleep than grown-up persons, and yet Dr. Hertel tells us that some boys work eleven or twelve hours a day, and others, from eight to nine years of age, do not go to bed till eleven o'clock.* It is evident from the facts stated, that such excessive brain exercise is in the highest degree deleterious. It must tend to reduce the strength and vigour of the children, and to frustrate the object in view. Parents and teachers, on whom the responsibility rests, should be made acquainted with the danger of such enforced educational training, and the injurious consequences that must result when it is persisted in. It lessens the capacity to learn in the long run. Children should have from nine to ten hours sleep, and retire early to bed before they are too tired.

The only course which seems likely to remedy this evil, is one which has already been repeatedly suggested, viz. to place the schools under medical supervision—to insist upon each of the children being examined periodically by a competent medical officer, who would very often be able to detect trivial deviations from health, which, being removed, could not be followed by those serious conditions which so often are brought before our notice.

In any case where the mind of the child seemed to be suffering from overwork, the work would be at once remitted. It appears that the systematic medical

* Over-pressure in High Schools in Denmark, 1885, p. 69.

supervision of the schools is a matter of greater urgency, inasmuch as the "education" of the poorer classes is not likely to be diminished, but to be pushed forward to a degree which will probably become a source of disaster to a very large proportion of the rising generation.

If there is myopia, hypermetropia, or astigmatism, these must be attended to. In one hundred consecutive cases of chronic headache, in which the eyes were examined, and their defects corrected by Dr. Stevens, sixty-one obtained permanent relief, nine received temporary and marked improvement, three received no improvement, and in thirty no knowledge of their subsequent history could be obtained.*

No doubt the present system of forcing children is carried to an absurd degree—to a degree which is sometimes followed by irreparable injury to the children in after life.

We must face this question in a calm and dispassionate manner, for the health of the coming race cannot be disregarded if the vigour of the country is worth consideration, and disease and early death are to be prevented. "In bringing up a child, think of its old age" (Joubert.)

* *Op. cit.*, p. 49.

FORMULÆ.



- (1) R. Potass. Citrat., ℥j.
Inf. Digitalis,
Inf. Buchu, āā ℥ss.

Misce.—To be taken three times a day.

In uræmic headache, with deficient renal action.

- (2) R. Potass. Citrat., ℥j.
Spt. Juniperi, ℥j.
— Æther. Nitr., ℥xx.
Decoct. Scoparii, ℥j.

Misce.—To be taken three times a day.

In the same cases as the above.

- (3) R. Potass. Bitart., ℥ss.
Syr. Limonis, ℥ss.
Aquæ ferventis, Oij.

Misce.

To be taken during the day and night in the same cases, where the urine is scanty and the bowels are sluggish.

- (4) R. Hydrarg. Perchlorid., gr.j.
Tinct. Ferri Perchlor.,
Glycerini, āā ℥ss.
Aquæ puræ, ad ℥xij.

Misce.—A tablespoonful in an equal quantity of water, or one ounce of Infusion of Quassia, three times a day.

In anasarca and anæmia, where headache is due to renal congestion, and in some forms of syphilitic headache when the cachectic state is well marked.

- (5) R. Quiniæ Disulph., gr.x.—gr.xv.
 Acid. Sulph. Dil., ℥x.
 Syrupi —, ʒij.
 Aquæ, ad ʒiss.
 Misce.

To be taken in headache from malarial poisoning, two or three hours before the expected paroxysm. Afterwards, a third part three times a day till cinchonism is produced. (Dr. Smith.)

- (6) R. Liquor. Fowleri,
 Tinct. Belladonnæ, āā ʒj.
 Aquæ puræ, ad ʒiss.
 M. Sig.—A teaspoonful in a wineglassful of water
 three times a day.

In the same cases, where the headache recurs from time to time.

- (7) R. Quiniæ Disulph., ʒss.
 Acid. Arseniosi, gr.j.
 — Nitric. Dil. ʒj.
 Aquæ puræ, ad ʒj.
 M. Sig.—Thirty drops in a wineglassful of water
 three times a day after food.

In similar cases to the above. (Dr. Routh's formula for giving Arsenic.)

- (8) R. Liquor. Cinchonæ, ℥xx.
 ——— Fowleri, ℥v.
 Aquæ puræ, ad ʒj.
 M. Sig.—To be taken three times a day after food.

In neuralgic headache and cerebral anæmia.

- (9) R. Liquor. Fowleri, ʒj.
 Tinct. Quiniæ, ʒiss.
 Mist. Camph., ad ʒvj.
 M. Sig.—ʒss three times a day in a little water after
 food.

In neuralgic and periodic headache.

- (10) R. Liquor. Potass. Ars., ʒj.
 Tinct. Quiniæ, ʒiiss.
 Hydr. Perchlor., gr. $\frac{1}{2}$.
 Aquæ, ad ʒvj.

Misce.—A tablespoonful in a wineglassful of water
three times a day after food.

In neuralgic headache, where a mercurial is desirable, and there is
the history of syphilis.

- (11) R. Liquor. Potass. Ars.,
 ——— Potassæ, āā ʒj.
 Tinct. Colchici, ʒij.
 ——— Lavand. Co., ʒiij.
 Aquæ puræ, ad ʒvj.

Misce.—A tablespoonful in a wineglassful of water
twice a day after food.

In neuralgic headache associated with the gouty diathesis.

- (12) R. Tinct. Quiniæ, ʒxiv.
 Spt. Chloroformi, ʒij.

Misce.—A teaspoonful in a wineglassful of water
twice or three times a day.

In neuralgic and nervous headache (a valuable formula).

- (13) R. Tinct. Quiniæ, ʒvj.
 Potass. Bromid., ʒj.—ʒij.
 Glycerini, ʒij.
 Mist. Camphoræ, ad ʒvj.

Misce.—A sixth part twice or three times a day.

In neuralgic and nervous headache.

- (14) R. Acid. Hydrobromici Dil., ʒvj.
 Quiniæ Disulph., gr. xij.
 Inf. Gent. Comp., ad ʒxij.

Misce.—Two tablespoonfuls twice or three times a
day.

In neuralgic and nervous headache, where Quinine alone disagrees.

- (14 a) R. Acid. Hydrobromici Dil., ℥vj.
 Liquor. Strychniæ, ℥xxxvj.
 Spt. Chloroformi, ℥j.—℥ij.
 Aquæ puræ, ad ℥xij.

Misce.—Two tablespoonfuls three times a day.

In similar cases to the above, where a nervine tonic is required.

- (15) R. Sodæ Bicarb.,
 Bismuth. Subcarb.,
 Pulv. Acaciæ, āā ℥j.
 Spt. Amm. Arom., ℥ij.
 Syr. Zingib., ℥iij.
 Aquæ puræ, ad ℥viiij.

Misce.—Two tablespoonfuls three times a day half
 an hour before food.

In dyspeptic headache with flatulence, acidity, and pyrosis.

- (16) R. Amm. Carb., gr. iv.
 Aquæ, ℥j.

Misce.—To be taken every three or four hours.

In dyspeptic, neuralgic, and nervous headache, and in some forms of
 gouty headache.

- (17) R. Spt. Amm. Arom., ℥xl.
 — Chloroformi, ℥x.
 Aquæ, ad ℥j.

Misce.—To be taken every three hours.

In dyspeptic and nervous headache.

- (18) R. Sodæ Citro-Tart. Efferv., ℥j.—℥ij. (B. P.)
 To be taken whilst effervescing in the third of a
 tumblerful of cold water early in the
 morning.

As a mild aperient in dyspeptic or bilious headache, with nausea and
 sickness, and in plethoric headache.

(19) R. Magnes. Sulphat., ʒvj .

———— Carb., ʒj .

Tinct. Lavand. Co., ʒiij .

Aquæ Menth. Pip., ad ʒviij .

Misce.—A sixth part to be taken early in the morning, and repeated as may be necessary.

In dyspeptic and bilious headache with flatulence.

(20) R. Quiniæ Disulph., gr. xij.

Acid. Sulph. Dil., ʒss .

T. Ferri Perchlor., ʒij .

Spt. Chloroformi, ʒij .

Magnes. Sulph., ʒiss .

Syr. Zingib., ʒj .

Aquæ, ad ʒxij .

Misce.—Two tablespoonfuls three times a day.

In neuralgic headache with constipation.

(21) R. Syr. Ferri Phosph. et Quiniæ et Strychniæ, ʒiss .

A teaspoonful in a wineglassful of water three times a day after food.

In neuralgic and nervous headache.

(22) R. Syr. Ferri Hypophos., ʒiss .

A teaspoonful in a wineglassful of water three times a day after food.

In neuralgic and nervous headache, where the hypophosphites are useful, and in some congestive headaches.

(22 a) R. Syr. Ferri et Calcii Lactophosph. ʒij .

One or two teaspoonfuls in a wineglassful of water twice a day after food. Fifteen or twenty grains of bromide of potassium or ammonium may sometimes be added to each dose.

In similar cases to the preceding marked by general debility and defective nutrition.

- (22 b) R. Liq. Ferri Hypophosphitis Co.
 A teaspoonful to be taken in water or raisin wine for a child ten years of age, and two teaspoonfuls for an adult in water or Carlowitz. It is said to be a better preparation than "Parrish's Chemical Food" for children.*

- (23) R. Calcis Hypophos., gr.80.
 Tinct. Ferri Perchl., ʒiij.
 Quiniæ Disulph., gr.xvj.
 Strychniæ, gr.½—gr.j.
 Spt. Chloroformi, ʒij.
 Syrupi, ʒiss.
 Aquæ puræ, ad ʒviiij.
 Misce.—A tablespoonful to be taken three times a day in a wineglassful of water.

In similar cases to the above.

- (24) R. Ferri. Citr. et Quiniæ, ʒss.
 Spt. Chloroformi, ʒj.
 Syr. Aurant., ʒiij.
 Aquæ puræ, ad ʒvj.
 Misce.—A sixth part three times a day after food.

In neuralgic and nervous headache, with anæmia and depression, and in some congestive headaches.†

- (24 a) R. Liquor. Ferri Dialysati, ʒj.
 Misce.—Ten to thirty minims in a wineglassful of water twice or three times a day.

In similar cases to the preceding, and especially in the anæmic headache of children.

* See Martindale's *Extra Pharmacopœia*, 1885, p. 274.

† Three to five drops of the Liquor Strychniæ, and half an ounce of the Tincture of Calumba, may be sometimes added to this prescription with advantage.

- (24 b) R. Ferri Amm. Citr. ℥ij.
 Liq. Potass. Ars. ℥xl.
 Syr. Zingib., ℥ss.
 Inf. Calumbæ, ad ℥viiij.

Misce.—Two tablespoonfuls twice a day after food.

In nervous and neuralgic headache with anæmia.

- (25) R. Amm. Bromid., ℥j.
 Spt. Amm. Arom., ℥ss.
 Aquæ puræ, ad ℥iss.

Misce.—To be taken on rising in the early morning.

In some forms of nervous and congestive headache.

- (25 a) R. Potass. Bromid., ℥j.
 Spt. Amm. Arom., ℥ij.
 Amm. Carb.,
 Sodæ Bicarb., āā ℥ij.
 Syr. Aurant., ℥iij.
 Aquæ puræ, ad ℥viiij.

Misce.—A sixth part to be taken every four hours whilst effervescing with Acid. Citric., gr.xiv., dissolved in one teaspoonful of water.

In the early stage of nervous and neuralgic headache where there is nausea, and the tongue is coated.

- (26) R. Potass. Bromid., ℥ij.
 Spt. Amm. Arom., ℥iij.
 Mist. Camph., ad ℥vj.

Misce.—A sixth part three times a day.

In nervous and neuralgic headache, and where there is excitement and irritability.

- (26 a) R. Tinct. Aconiti, ℥ss.
 Aquæ puræ, ad ℥iv.

Misce.—A teaspoonful in a tablespoonful of water every half-hour till the pain is relieved.

In acute congestive headache, with flushed face and full pulse.

- (27) R. Amm. Chlorid., gr.x.— \mathfrak{D} j.
 Aquæ puræ, ad \mathfrak{z} iss.
 Misce.—To be taken three times a day.

In neuralgic and nervous headache, where *migraine* and *clavus* are specially marked.

- (27 a) R. Amm. Chlorid., \mathfrak{z} ij.— \mathfrak{z} iiij.
 Succi Taraxaci, \mathfrak{z} j.
 Inf. Calumbæ, ad \mathfrak{z} viiij.
 Misce.—An eighth part three times a day.

A valuable formula in some nervous headaches.

- (27 b) R. Potass. Bromid.,
 Amm. Bromid.,
 Sodii Bromid., $\mathfrak{a}\mathfrak{a}$ \mathfrak{D} ij.
 Syr. Aurant., \mathfrak{z} iiij.
 Aquæ puræ, ad \mathfrak{z} viiij.
 Misce.—An eighth part to be taken every four hours.

In some nervous and congestive headaches.*

- (28) R. Sodæ Hypophosphitis, \mathfrak{z} ss.
 Inf. Calumbæ, ad \mathfrak{z} vj.
 Misce.—A sixth part to be taken three times a day.

In neuralgic, nervous, and anæmic headache.

- (29) R. Magnes. Sulphat., \mathfrak{z} j.
 Quiniæ Disulph., gr.viiij.
 Acid. Sulph. Dil., \mathfrak{m} x.
 Inf. Rosæ Co., ad \mathfrak{z} viiij.
 Misce.—Two tablespoonfuls twice or three times a day after food.

In neuralgic and congestive headache, with constipation and full habit.

* Either of the tinctures of *nux vomica*, *digitalis*, or *belladonna* may be added sometimes with advantage, according to circumstances.

- (30) R. Tinct. Quiniæ, ʒvj.
Spt. Chloroformi, ʒj.
Mist. Camph., ad ʒvj.
Misce.—A sixth part three times a day.

In gouty and nervous headache, where Quinine is necessary.

- (31) R. Potass. Bicarb.,
Sodæ Bicarb., āā ʒiss.
Vin. Sem. Colch., ʒj.—ʒij.
Syr. Zingib., ʒss.
Aquæ, ad ʒviiij.
Misce.—Two tablespoonfuls three times a day, with
one tablespoonful of lemon juice, whilst
effervescing.

In gouty headache, and the headache of cerebral hyperæmia.

- (31 a) R. Quiniæ Sulphat., gr.xij.
Acid. Citric., ʒij.
Saccharin, gr.½.
Aquæ, ad ʒvj.
Misce.

- R. Potass. Bicarb., ʒiiss.
— Iodidi., ʒss.
— Bromid., ʒij.
Vin. Sem. Colch., ʒj.
Aquæ, ad ʒvj.
Misce.—A sixth part of each Mixture to be added
together, and taken at the close of effervescence twice a day, at 11 a.m. and 4 p.m.

In some cases of gouty and rheumatic headache.

- (32) R. Amm. Carb., ʒss.
Vin. Sem. Colch., ʒss.
Tinct. Aurant., ʒss.
Aquæ, ad ʒiss.
Misce.—A teaspoonful in half a tumblerful of Apollinaris or Vichy water three times a day.

In gouty headache.

- (33) R. Lithiæ Citrat., ʒij.
Potass. Bicarb., ʒiiss.
Tinct. Aurant., ʒss.
Aquæ, ad ʒiv.

Misce.—A tablespoonful in half a tumblerful of water three times a day.

In gouty headache, where the urine is turbid, or contains uric acid in excess.

- (34) R. Potass. Iodidi, ʒss.—ʒj.
——— Bicarb., ʒij.
Vin. Sem. Colch., ʒxl.
Amm. Carb., gr.xxiv.
Syr. Zingib., ʒss.
Aquæ, ad ʒviiij.

Two tablespoonfuls three times a day.

In rheumatic headache.

- (34 a) R. Potass. Iodidi, ʒss.
Tinct. Valerian.
Spt. Amm. Arom., āā ʒvj.
Aquam., ad ʒviiij.

Misce.—A sixth part three times a day.

In rheumatic headache.

- (35) R. Potass. Iodidi,
Amm. Chlorid., āā ʒiss.
Inf. Humuli, ʒvj.

Misce.—A tablespoonful three or four times a day in a wineglassful of water.

In rheumatic headache. (Dr. Smith.)

- (36) R. Potass. Iodidi, ʒj.
Tinct. Cinch. Co., ʒj.
——— Colch., ʒj.
Aquæ Cinnamomi, ad ʒxij.

Misce.—Two tablespoonfuls three times a day.

In rheumatic headache.

- (36 a) R. Ferri Amm. Citr., ʒss.
 Quiniæ Sulph., gr.xviiij.—ʒss.
 Acid. Citric., gr.cii.
 Saccharin, gr.½.
 vel Syr. Aurant., ʒvj.
 Aquæ, ad ʒvj.
 Misce.

- R. Potass. Bicarb., ʒiiss.
 Amm. Bromid., ʒiiss.
 Aquæ, ad ʒvj.

Misce.

A sixth part of each Mixture to be added together and taken twice a day at the close of effervescence.

In some cases of neuralgic, gouty, and rheumatic headache.

- (37) R. Potass. Iodidi, ʒij.
 *Liquor. Hydr. Bichlor., ʒvj.—ʒiiss.
 Tinct. Gent. Comp., ʒiiss.
 Aquæ Cinnamomi, ad ʒxij.

Misce.—Two tablespoonfuls three times a day in a wineglassful of water after food.

In syphilitic and organic headache.

- (38) R. Potass. Iodidi, ʒj.
 Liq. Arsenicalis, ʒj.
 Tinct. Quiniæ, ad ʒiiij.

Misce.—A teaspoonful in a wineglassful of water three times a day after food.

In syphilitic headache.

* The Mercury may be omitted according to circumstances.

(39) R. Tinct. Ferri Perchlor., ʒijss.

Acid. Sulph. Dil.

vel Spt. Chloroformi, ʒj.

Tinct. Lavand. Co., ʒvj.

Syr. Aurant., ʒss.

Mist. Camph., ad ʒiv.

Misce.—Two teaspoonfuls three times a day in a wineglassful of water.

In nervous headache from menorrhagia.*

(40) R. Potass. Bromid., ʒj.

Syr. Tolutani, ʒj.

Aquæ, ad ʒiss.

Misce.—To be taken every night at bedtime.

As a sedative in the pain and sleeplessness of nervous and neuralgic headache.

(41) R. Acid. Hydrocy. Dil., ʒss.

Aquæ, ad ʒiss.

Misce.—A teaspoonful in a tablespoonful of water every two or three hours.

In the sickness and nausea of nervous headache.

(42) R. Acid. Hydrocy. Dil., ʒxxiv.

Potass. Bicarb., ʒj.

Aquæ, ad ʒvj.

Misce.—Take a sixth part, with eight grains of Acid.

Citric. dissolved in a tablespoonful of water, whilst effervescing.

In similar cases to the preceding, and in the sickness and acidity of dyspeptic headache.

* One of the prescriptions containing Arsenic or Ergot may be necessary according to the discretion of the practitioner, or either of these remedies may be added to the Formula.

- (43) R. Spt. Chloroformi, ℥x.
Liquor. Strychniæ, ℥iv.
Decoct. Aloes Comp., ad ʒiss.
Misce.—To be taken early every morning.

In the constipation of nervous headache.

- (44) R. Acid. Citric, ʒijss.
Quiniæ Dis., gr.xij.
Syr. Aurant., ʒiss.
Aquæ puræ, ad ʒvj.
Misce.

- R. Potass. Bicarb.
vel Sodæ Bicarb., ʒiij.
Amm. Carb., ʒij.
in pulveres xij.

Signetur.—One powder to be dissolved in a claret-glassful of water, then mixed with a tablespoonful of the mixture, and taken three times a day whilst effervescing.

In some forms of nervous headache where there is nausea and depression.

- (45) R. Sodæ Bicarb., ʒiss.
Spt. Amm. Arom., ʒij.
Tinct. Gent. Comp., ʒss.
Syr. Aurant., ʒss.
Inf. Gent. Co., ad ʒviiij.

Misce.—Two tablespoonfuls three times a day.

In nervous headache with dyspepsia, furred tongue, and acidity.

- (45 a) R. Sodæ Bicarb., gr.lxxx.
Tinct. Aurant., ʒss.
Inf. Calumbæ, ad ʒviiij.

Misce.—An eighth part to be taken three times a day.

In similar cases to the preceding.

- (46) R. *Ferri et Amm. Citr., ʒss.
 Acid. Citric., ʒj.
 Quiniæ Sulph., gr.vj.
 Aquam, ad ʒvj.
Misce.—A sixth part to be taken three times a day
 in effervescence, with Sodæ Bicarb., gr.x.,
 previously dissolved in a tablespoonful
 of water.

- (47) R. Acid. Nitric. Dil., ʒj.
 —— Hydrochlor. Dil., ʒij.
 Liquor. Strychniæ, ℥xxxvj.
 Inf. Quassiæ, ad ʒxij.
Misce.—Two tablespoonfuls three times a day.

In nervous headache with a clean tongue and slow digestion.

- (48) R. Tinct. Nuc. Vom., ʒj.
 Acid. Nitr. Dil., ʒj.
 —— Hydrochlor. Dil., ʒij.
 Tinct. Aurant., ʒvj.
 Aquam, ad ʒvj.
Misce.—A tablespoonful in a wineglassful of water
 three times a day.

In nervous headache where Strychnia does not agree. The Liquor Strychniæ sometimes causes nervous depression, sickness, and muscular tremors, which I have occasionally noticed as the effect of the Ferri Citr. et Strychniæ in gastralgia.

- (48 a) R. Acid. Nitric. et Mur. Dil., ʒj.
 Tinct. Aurant., ʒij.
 Spt. Chloroformi, ʒj.
 Aquaæ, ad ʒvj.
Misce.—A sixth part to be taken three times a day.

In nervous headache.

* Three to five minims of the Liquor. Strychniæ may be added in some cases.

(49) R. Tinct. Digitalis, ʒss.—ʒij.

Mist. Camphoræ, ad ʒvj.

Misce.—A sixth part to be taken three times a day.

In the headache of cerebral anæmia as a cardiac tonic, when the pulse is small and frequent, or there is palpitation.

(50) R. Tinct. Digitalis, ʒss.—ʒij.

Spt. Chloroformi, ʒj.

Syr. Aurant. Flor., ʒiij.

Aquæ, ad ʒvj.

Misce.—A sixth part to be taken three times a day.

In the headache of cerebral anæmia, where depression is to be guarded against.

(51) R. Inf. Digitalis, ʒvj.

Misce.—Two teaspoonfuls to be taken three times a day.

In similar cases to the preceding, especially if accompanied with dilatation, or fatty change of the heart.

(52) R. Tinct. Belladonnæ, ʒij.—ʒiij.

—— Nuc. Vom., ʒj.

Syr. Zingib., ʒss.

Aquæ, ad ʒvj.

Misce.—A tablespoonful in a wineglassful of water three times a day.

In some forms of anæmic headache.

(53) R. Strychniæ Sulph., gr. $\frac{1}{2}$.

Tinct. Ferri Chlorid., ʒij.

Glycerini, ʒss.

*Inf. Gent. Comp., ad ʒvj. (Dr. Smith.)

Misce.—A tablespoonful in a wineglassful of water three times a day after meals.

In the headache of cerebral anæmia with nervous exhaustion.

* The Infusion of Quassia or Calumba is preferable to Gentian, in consequence of the decomposition of the iron in the latter preparation.

- (54) R. Amm. Carb., ʒss.
 Tinct. Calumbæ,
 Syr. Aurant., āā ʒiij.
 Aquæ puræ, ad ʒvj.

Misce.—A sixth part to be taken twice a day.

In the headache of cerebral softening.

- (55) R. Amm. Carb., ʒss.
 Tinct. Lavand. Comp., ʒss.
 ——— Calumbæ, ʒiij.
 Mist. Camph., ad ʒviij.

Misce.—Two tablespoonfuls to be taken three times a day.

In the headache of cerebral softening with irritability and depression, and in some congestive headaches,

- (55 a) R. Spt. Amm. Succinatus, ʒss.
 Tinct. Lavand. Comp., ʒiij.
 Mist. Acaciæ, ʒj.
 Inf. Calumbæ, ad ʒviij.

Misce.—A sixth part three times a day.

In similar cases to the preceding.

- (55 b) R. Amm. Carb., ʒj.
 Sacch. fæcis, ʒij.
 Aquæ Menth. Pip., ʒiiss.
 Tinct. Lavand. Comp., ʒij.
 Aquæ, ad ʒvj.

Misce.—A fourth part every four hours.

In nervous headache, etc.

- (56) R. Potass. Bicarb., ʒj.
 ——— Iodidi, gr. xviiij.
 Spt. Amm. Arom., ʒiij.
 Mist. Camph., ad ʒviij.

Misce.—A sixth part three times a day after food.

In organic headache due to syphilis, or gout.

- (57) R. Spt. Chloroformi, ℥v.
Liq. Ergot. Ext., ℥xx.—℥ss.
Aquæ puræ, ad ℥j.
Misce.—To be taken three times a day.

In the congestive and organic forms of headache in advanced life.

- (58) R. Liq. Ergot. Ext., ℥ij.
Aquæ, ad ℥vj.
Misce.—Two teaspoonfuls, to be gradually increased
to two tablespoonfuls, three times a day.

In congestive headaches from organic disease.

- (59) R. Sodæ Pot. Tart., ℥ij.
Potass. Bicarb., ℥j.
Syr. Aurant., ℥iss.
Aquæ, ad ℥iss.
Misce.—The draught to be taken in effervescence
with Acid Citric., gr.xv., dissolved in
a tablespoonful of water, early in the
morning.

In dyspeptic and plethoric headaches.

- (60) R. Magnes. Sulph., ℥ij.
Sodæ Bicarb., ℥ij.
Liquor. Taraxaci, ℥vj.
Tinct. Zingib., ℥j.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part to be mixed with Acid. Tart.,
℥j, previously dissolved in a tablespoonful
of water, and taken early in the morning
whilst effervescing.

In dyspeptic and plethoric headaches with sluggish liver.

- (61) R. Quinæ Sulph., gr.vij.
Acid. Citric., ℥ij.
Aquæ puræ, ad ℥iv.
Misce Sig.—No. 1 Mistura.

- R. Sodæ Bicarb., \mathfrak{z} ijj.
 Liquor. Taraxaci,
 Syr. Aurant., āā \mathfrak{z} ss.
 Aquæ puræ, ad \mathfrak{z} viiij.

Misce, Sig.—No. 2 Mistura.

One tablespoonful of No. 1 to be mixed with
 two tablespoonfuls of No. 2, and taken
 whilst effervescing three times a day.

In similar cases to the above, where Quinine is admissible.

- (62) R. Tinct. Cinch. Comp., \mathfrak{z} j.
 Spt. Amm. Arom., \mathfrak{z} ss.

Misce.—A teaspoonful in a wineglassful of water
 three times a day.

In some passive congestive headaches, where a tonic and stimulant
 are required.

- (63) R. Potass. Bromid., \mathfrak{z} ss.
 Tinct. Cannabis Ind.,
 ——— Hyoscyami, āā \mathfrak{z} ss.
 Aquæ puræ, ad \mathfrak{z} j. (Clouston.)

Misce.—To be taken at bedtime.

In the sleeplessness of hyperæmic headache.

- (64) R. Tinct. Cannabis Ind., mx .
 Potass. Bromid., \mathfrak{z} j.
 Aquæ puræ, ad \mathfrak{z} iss.

Misce.—To be taken at bedtime.

In the sleeplessness of hyperæmic headache.

- (65) R. Tinct. Hyoscyami, \mathfrak{z} ss.
 Mist. Camph., ad \mathfrak{z} j.

To be taken every night at bedtime.

In the sleeplessness of nervous and hyperæmic headache.

- (66) R. Hydrat. Chloral., \mathfrak{z} j.
 Aquæ puræ, ad \mathfrak{z} iss.

Misce.—To be taken at bedtime.

In the headache of cerebral hyperæmia and vascular excitement.

- (67) R. Hydrat. Chloral.,
Potass. Bromid., āā gr.x.
Syr. Rhœados, ʒj.
Aquæ puræ, ad ʒiss.

Misce.—To be taken at bedtime.

In the headache of cerebral hyperæmia and nervo-hyperæmia headache with nervous excitement.

- (68) R. Potass. Bromid., ʒij.
Syr. Aurant., ʒss.
Inf. Gent. Comp., ʒiv.
Aquæ puræ, ad ʒvj.

Misce.—A sixth part to be taken three times a day.

In nervo-hyperæmic headache with loss of appetite and debility.

- (69) R. Potass. Bromid.
vel Hydr. Chloral., gr.x.
Nepenthe, m̄x.
Aquæ puræ, ad ʒiss.

Misce.—To be taken at bedtime.

In the sleeplessness of nervo-hyperæmic headache.

- (70) R. Syr. Hydrat. Chloral., ʒiss.

Misce.—One teaspoonful in a wineglassful of water in the nervo-hyperæmic form of headache at bedtime, or in the daytime, when the pain is severe, till sleep comes on.

- (71) R. Ferri et Amm. Citr., ʒj.
Potass. Bromid., ʒij.
vel Amm. Bromid., ʒiij.
Syr. Zingib., ʒss.
Aquæ puræ, ad ʒvj.

Misce.—A tablespoonful in a wineglassful of water twice a day, at 11 a.m. and 4 p.m.

In the headache of cerebral anæmia.

- (72) R. Potass. Bromid., ℥j.
 vel Amm. Bromid., ℥j.
 Tinct. Valerian. Co., ʒj.
 Syr. Aurant. Flor., ʒj.
 Aquæ Cinnamomi, ad ʒiss.
 Misce —To be taken twice or three times a day.

In some forms of neuralgic headache.

- (73) R. Pulv. Ipecac. Comp., gr.x—gr.xv.
 Fiat pulvis.—To be taken at bedtime in gruel.

In rheumatic headache.

- (76) R. Ferri Sulphat.,
 Pulv. Zingib., āā gr.vj.
 Ext. Aloes Aquos.,
 Quiniæ Sulph.,
 Saponis, āā gr.xij.
 Misce et divide in pilulas xij.—One to be taken twice
 a day after food.

In the headaches of cerebral anæmia and neuralgia, where the bowels are sluggish.

- (77) R. Ext. Aloes Barb., gr.¼.
 Pulv. Ipecac., gr.j.
 Pil. Rhei Comp., gr.ijj.
 Misce et fiat pilula.—To be taken daily before dinner.

In the headache of cerebral anæmia and dyspeptic headache, where intestinal action is sluggish.

- (78) R. Quiniæ Sulph.,
 Ext. Aloes Aquos, āā gr.xij.
 Pulv. Capsici,
 — Ipecac., āā gr.vj.
 Glycerini, q. s.
 Ut fiant pilulæ xij.—One to be taken daily before
 food, at midday.

In similar cases to the preceding, and especially in women with small assimilative power.

- Vel. R. Ext. Nuc. Vom., gr. $\frac{1}{2}$.
 Pil. Rhei Comp., gr. iij.
 Pulv. Capsici, gr. $\frac{1}{4}$.
 Misce et fiat pilula.—To be taken daily at 12 o'clock.
 (Samaritan Hospital.)

An excellent pill to keep the bowels regular in nervous headache, where the muscular fibre of the intestines requires stimulation.

- (79) R. Hydr. Subchlorid., gr. iij.
 Pil. Coloc. Co., gr. vj.
 Ext. Hyoscyami, gr. ij.
 Misce et divide in pilulas ij.—To be taken at bed-time occasionally.

As a cholagogue cathartic in dyspeptic, bilious, and gouty headache.*

- (80) R. Pulv. Scammonii, ℥j.
 Ext. Coloc. Co., ℥j.
 Hydr. Subchlorid., gr. xij.
 Ol. Carui, ℥x.
 Misce et divide in pilulas xvij.—One or two occasionally at bedtime, in similar cases to the preceding.

- (81) R. Pil. Hydrarg., gr. xij.
 — Rhei Comp., 3ss.
 Ext. Hyoscyami, gr. x.
 Misce et divide in pilulas xij.—One or two at bed-time twice a week.

In dyspeptic headache, and in the headaches of advanced life with a sluggish liver.

- (81 a) R. Ext. Aloes Barb., gr. iij.—gr. vj.
 — Taraxaci,
 Pepsinæ Porci, āā gr. xxiv.
 Misce et divide in pilulas xij.

Two at bedtime, or before dinner. In slow digestion and torpid bowels, in delicate subjects.

- (82) R. Hyd. \bar{c} . Cretâ, gr.xij.
Ext. Hyoscyami, gr.x.
Pil. Rhei Comp., \mathfrak{z} ij.
Misce et divide in pilulas xij.—One or two occasion-
ally at bedtime.

As an alterative in dyspeptic headache.

- (82 *b*) R. Pil. Hydrarg., gr.j.
Ext. Coloc. Co., \mathfrak{z} ss.
— Hyoscyami, gr.x.
Misce et divide in pilulas x.—One every fifth night.

In dyspeptic headache and sluggish liver.

- (83) R. Ferri Sulphat.,
Quiniæ Sulph., $\bar{a}\bar{a}$ gr.xij.
Pulv. Rhei, gr.ix.
— Zingib., gr.vj.
Misce et divide in pilulas xij.—Take one three times
a day.

In neuralgic headache and atonic dyspepsia with flatulence.

- (84) R. Pil. Aloes et Assafœtid., \mathfrak{z} j.
In pilulas xij.—One or two at bedtime every night.

In nervous headache with flatulence and constipation.

- (85) R. Pil. Aloes et Ferri, \mathfrak{z} j.
In pilulas xij.—One or two at bedtime every night.

In neuralgic and nervous headache with constipation.

- (86) R. Pil. Aloes et Myrrhæ, \mathfrak{z} j.
Ferri Sulphat., gr.vj.
Misce et divide in pilulas xij.—Two occasionally at
bedtime.

In nervous or anæmic headache with torpid colon.

- (87) R. Zinci Valerian., gr.xij.
Pulv. Rhei, gr.xx.
—— Zingib., gr.vj.
Ext. Gentian, gr.xij.
Misce et divide in pilulas xij.—One to be taken three times a day.

In neuralgic headache, and in headaches of advanced life.

- (88) R. Phosph. Pur.,
Strychniæ, āā gr.j.
Conf. Rosæ, q. s.
Ut fiant pilulæ l.—Take one three times a day.

In some forms of neuralgic headache.

- (89) R. Phosph. Pur., gr.j.
Conf. Rosæ, q. s.
Ut fiant, pilulæ xxxvj.—Take one three times a day.

In similar cases to the preceding.*

- (90) R. Phosph. Pur., gr. $\frac{1}{4}$.
Ferri Redact., gr.xx.
Ext. Nuc. Vom., gr.ij.
Misce et divide in pilulas viij.—One to be taken twice a day.

In neuralgic headache.†

- (91) R. Phosph. Pur., gr.j.
Quiniæ Sulph.,
Ferri Sulph., āā gr.xvj.
Ext. Rhei, ℥j.
In pilulas xxxvj.—One to be taken three times a day.

* Perles of Phosphorus are manufactured by Messrs. Corbyn, Stacey, and Co., each Perle containing gr. $\frac{1}{30}$, gr. $\frac{1}{60}$, gr. $\frac{1}{120}$. They are hermetically closed in a covering of gelatine, and the dose and effect of the remedy may be relied upon. When Phosphorus is prescribed alone, the Perle is the best method of administering it.

† These prescriptions may be varied according to the state of the patient; Valerianate of Zinc and Cannabis Indica may sometimes be added.

- (92) R. Ext. Cannabis Ind., gr. $\frac{1}{4}$ —gr. j.
 Conf. Rosæ, q. s.
 Ut fiat pilula.—To be taken at bedtime.

In the sleeplessness of neuralgic headaches.

- (92 a) R. Ext. Cannabis Ind., gr. viij
 Quinæ Sulph., gr. xxiv.
 Pil. Rhei Comp., ʒss.
 Misce in pilulas xxiv.—Take one night and morning.
 In obstinate cases the cannabis indica may
 be increased to half-grain doses.

- (92 b) R. Ext. Cannabis Ind., gr. vj.
 Pil. Assafœtidæ Co., ʒij.
 Quinæ Sulph., gr. xxiv.
 Acid. Carbolæ, gr. vj.
 Misce et divide in pilulas xxiv.—Take one night and
 morning.

- (92 c) R. Ext. Cannabis Ind., gr. xij.
 — Gentianæ, gr. xxiv.
 Pil. Aloes i Myrrhæ, ʒij.
 Misce et divide in pilulas xxiv.—One night and
 morning.

- (92 d) R. Ext. Cannabis Ind., gr. xii.
 — Nuc. Vom., gr. iij.—gr. vj.
 Zinci Valerian.,
 Pil. Rhei Comp., āā gr. xij.
 Misce et divide in pilulas xii.—Take one three times
 a day.

The above formulæ are the most useful for giving cannabis indica, combining it with quinine if the case is neuralgic, or associated with malaria ; with carbolæ acid, or assafœtidæ, if there is flatulence ; and with aloes and myrrhæ if the bowels are sluggish.

- (93) R. Pulv. Camphor., gr.ij.
Ext. Hyoscyami, gr.ij.
Misce et fiat pilula.—To be taken at bedtime.

In the sleeplessness of nervous and neuralgic headache.

- (94) R. Podophyllin, gr.iv.
Pil. Hydrarg., gr.vij.
Ext. Hyoscyami, gr.xvj.
Misce et divide in pilulas viij.—Take one every night.

In gouty headache.

- (94 a) R. Potass. Iodidi, ʒj.
Ext. Colch. Acet., gr.x.
Mucilag. Acaciæ q. s. ut fiant pilulas xx.—One or two
to be taken twice or three times a day.

In gouty headache. The pills to be preserved in a glass-stoppered bottle.

- (95) R. Pil. Coloc. c̄ Hyos., ʒj.
In pilulas xij.—One or two at bedtime occasionally

In nervous headache, when an active aperient is required.

- (95 a) R. Euonymin, gr.xxiv.
Ext. Coloc. Co.,
—— Hyoscyami, āā gr.xij.
Ut fiant pilulæ, xii.—One occasionally at bedtime

In gouty headache.

- (96) R. Ext. Colocynth., ʒij.
—— Rhei,
Pulv. Scammonii, āā gr.x.
In pilulas xij.—Take one occasionally at bedtime.

In nervous or dyspeptic headache as an active aperient.

- (97) R. Zinci Valerian.,
 Ferri Sulph.,
 Ext. Rhei, āā gr.xvj.
 Misce et divide in pilulas xvj.—One to be taken
 three times a day.

In nervous headache.

- (97 a) R. Zinci Sulph., gr.j.
 Ext. Nuc. Vom., gr.½.
 Conf. Rosæ, q. s.
 Ut fiat pilula.—To be taken twice a day.

In nervous headache.

- (98) R. Zinci Oxyd., gr.ij.
 Conf. Rosæ, q. s.
 Ut fiat pilula.—To be taken three times a day.

In nervous headache.

- (99) R. Pil. Rhei Comp., 3j.
 In pilulas xij.—Take one every night.

As a mild aperient in nervous and dyspeptic headache.

- (100) R. Pulv. Ipecac., gr.vj.
 Ext. Aloes Barb., gr.xij.
 — Taraxaci, 3ss.
 Saponis, gr.x.
 Misce et divide in pilulas xij.—Take one every night,
 or before dinner daily.

As a laxative in nervous headache to assist digestion.

- (101) R. Pulv. Myrrhæ,
 — Rhei, āā gr.xvj.
 Pil. Aloes Barb., gr.xij.
 Ext. Anthemidis, 3ss.
 Ol. Caryophylli, m̄v.
 Misce et divide in pilulas xx.—One or two daily
 before the midday meal.

As a dinner pill in nervous and dyspeptic headache to assist digestion.

- (102) R. Ext. Opii
 Pulv. Rhei, āā gr.j.
 Pil. Coloc. Co., gr.iss.
 Misce et fiat pilula.—To be taken every night.

In the sleeplessness of anæmic headache.

- (103) R. Ext. Gentian.,
 Ferri Sulph.,
 Pulv. Digitalis, āā gr.xij.
 — Cinnamomi, gr.vj.
 Misce et divide in pilulas xij.—Take one three times
 a day.

In the headache of cerebral anæmia, where Digitalis is required. Where there is unsteadiness of the heart's action after food, and there is flatulence, the iron may be advantageously omitted, and Pulv. Zingib. substituted for Pulv. Cinnamomi.

- (104) R. Ext. Belladonnæ, gr.vj.—gr.xij.
 — Glycyrrhizæ, gr.xxiv.
 Misce et divide in pilulas xij.—Take one every night,
 or night and morning, but the remedy
 must be carefully watched.*

In the headache of cerebral anæmia.

- (105) R. Zinci Valerian., gr.viij.
 Ext. Humuli, gr.xx.
 — Rhei, gr.viij.
 Misce et divide in pilulas viij.—Take one every night.

In some forms of organic headache and cerebral softening, where there is irritability and sleeplessness.

- (105 a) R. Croton-Chloral, gr.iiij.
 Gelseminæ Hydrochlorat., gr. $\frac{1}{200}$.
 Mucilag. Acaciæ, g. s. ut.
 Fiat pilula.—To be taken every hour or two hours
 in severe cases of facial neuralgia.†

* See the effects of an overdose in Chapter I., on the Headache of Cerebral Anæmia.

† See *Extra Pharmacopœia*, by Martindale and Westcott, 4th Edition, p. 100.

- (106) R. Ext. Aconiti, gr.vj.
 — Hyoscyami, gr.xviii.
 Ant. Pot. Tart., gr.j.

Misce et divide in pilulas vj.—Take one every night.

In the headache of active cerebral hyperæmia, where depressants are required.

- (107) R. Bismuth. Subcarb., ℥j.
 To be taken in a wineglassful of water twice a day
 before meals.

In subacute congestive headache, with flatulence and discomfort after food.

- (108) R. Zinci Sulph., ℥j.
 Aquæ puræ, ℥iss.
 Fiat haustus.—To be taken as an emetic, followed by
 drinking freely of warm water till vomit-
 ing ensues.

In some forms of bilious and nervous headache.

- (109) R. Pulv. Ipecac., ℥j.
 Aquæ puræ, ℥iss.
 Fiat haustus.

In the same cases as the preceding.

- (109 a) R. Antipyrin, gr.xv.
 To be taken in a tablespoonful of water three times
 a day—morning, afternoon, and evening.

In migraine, and other forms of nervous headache.

- (110) R. Ext. Belladonnæ, gr.v.
 To be rubbed into the affected temple every night.

In nervous headache, migraine, clavus, etc.

- (111) R. Ung. Veratriæ, ℥j. (B.P.)
 A little to be rubbed into the affected temple till the
 pain is relieved.

In neuralgic and some forms of nervous headache, where the pain is localized.

- (112) R. Ung. Aconitiæ, ʒj. (B.P.)
To be used in the same way, and for the same cases
as the preceding.
Ung. Aconitinæ (Fleming).

- (113) R. Aconitinæ, gr.xvj.
Spt. Vini Rect., ʒxvj.
Rub together, and then add carefully one ounce of
lard. It may be used in the same cases
as the preceding. (*A very expensive ap-
plication.*)

- (114) R. Ext. Aconiti Alcohol., ʒj.
Adipis, ʒij.
Misce et fiat unguentum.—To be used in the same
cases as the preceding. (*Much less ex-
pensive.*)*

- (114 a) R. Ung. Hyd. Nit. Oxyd., ʒiss.
Adipis Benz., ʒijss.
Misce.—A piece the size of a small nut to be rubbed
into the scalp night and morning.

In pityriasis of the scalp.

- (115) R. Quiniæ Sulph., gr.x.
Acid. Sulph. Dil., ʒx.
Aquæ, ad ʒ100.
Misce.—To be injected in severe cases.†

(Surgeon-Major A. R. Hall's formula for the subcutaneous injection
of Quinine in the hyperpyrexia of sunstroke.)

* In using all these ointments care is required to apply very small quantities, and
never to the broken skin. A tingling sensation commonly precedes the cessation
of the pain.

† The acid in this gives rise to pain and inflammation, sometimes even to a trouble-
some boil or abscess. The neutral sulphate is soluble without acid, and does not
produce local irritation.

Formulæ for the hypodermic injection of morphine.

- (116) R. Morphinæ Sulphat., gr.lxxx.
 Atropinæ Sulphat., gr.ij.
 Acid. Carbolic, gr.j.
 Glycerini, ʒj.
 Aquæ destill., ad ʒij.
 Misce.

Six minims contain gr. $\frac{1}{2}$ of acetate of morphine, and gr. $\frac{1}{80}$ of sulphate of atropine. If only three minims are required, the same number of minims of water at 98° should be added, as it is easier to inject the larger quantity. The tendency to incrustation round the stopper of the bottle is entirely prevented by the glycerine. All morphine solutions should be recently prepared, as they are apt to decompose, and to turn of a dark vinegar brown colour.

- (117) R. Morphinæ Acet., gr.xij.
 *Acid. Acetic, q. s.
 Atropinæ Sulph., gr. $\frac{1}{8}$.
 Glycerini, ʒss.
 Aquæ destill., ad ʒss.
 Misce.

This solution contains one grain of morphine, and gr. $\frac{1}{80}$ of atropine in twenty minims.

The "Glycerole of Nepenthe," prepared by Messrs. Ferris & Co., of Bristol, is said to be an excellent preparation for hypodermic use; it will keep good for any length of time, and cause neither local irritation nor any after ill effects.

Many of the preceding formulæ are suitable for children in diminished doses according to age. Although morphine is rapidly eliminated by the kidneys, children are very susceptible to its influence.

* Just sufficient acetic acid should be used to render the morphine soluble, and the resulting solution should only slightly redden blue litmus.

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